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5 PRACTICAL SECURITY TIPS

Of all the security advice you'll read, these are the five 'must do' things...

If you surf for computer security advice, you'll probably find a lot of the same statements being repeated.

Some of them have been repeated so many times that we don't always stop to wonder whether they're still actually useful given the modern ways computer systems are attacked.

With that in mind, we've re-examined the most common tips around and asked ourselves: which are the ones that will actually help users in a practical sense? That way, you'll come away with a small pool of advice that'll keep you safe, instead of lots of things to do that might not make much of a difference in the long term. Because, after all, the best security advice is the stuff you can actually follow without too much effort.

1. Enable Two-Factor Authentication

The easiest way to gain access to your email (or other secure account) is to get hold of your password. Whether it's stolen from a site's database, intercepted over an unsecure connection, or phished from you directly, it's usually enough.

However, two-factor authentication (2FA) means that anyone logging in on an unrecognised device has to also be verified through a second channel. This usually means sending a code through a previously agreed channel – it may be a text message, a phonecall, an alert through an app or even an email to a secondary account – without which, the login can't be completed. You probably

already do a similar thing for your online banking, where a login code is generated from your debit card. That's the 'second factor' in the login.

Essentially, 2FA means that even a stolen username and password isn't enough to access an account. Even if the password is weak and easily guessed, there's an extra security measure in place. The method isn't perfect – it can still be beaten if someone steals your phone, hacks your email or takes control of your PC, and if you haven't got a verified channel available then accessing your own account get a little tricky (and frustrating) – but if you want to keep your email and social media accounts safe, it's worth doing anywhere that supports it.

2. Keep Your Popular Software Patched

Security vulnerabilities exist in almost every program, but you don't have to worry about obscure packages almost no-one uses. Hackers and malware writers concentrate on the software security holes that give them the best chance of infecting the most users, and that means exploiting programs that are on almost every PC.

Unpatched software is one of the leading security threats on a system, because as soon as a fix is released, hackers can begin reverse-engineering the update to find out what it was – and then writing software that'll deliberately target the unpatched users.

Obviously, your operating system and browser should



be kept up to date, but there are other programs that are as widespread which may not be as obvious. Java, for example, is on almost every PC – but because you don't run it separately, you may not remember to keep it updated. Similarly, Adobe Flash and Acrobat Reader are commonly installed but rarely attended to.

It's no surprise that all three of those programs have automatic update processes, and while it may seem irritating or inconvenient, allowing them to update as soon as they want to is the best way to remain secure.

3. Don't Re-Use Passwords

Although it's important to use passwords that can't be easily broken, it's actually more important that you don't use the same password everywhere. We'd probably even advise using lots of weak passwords above a single very secure one, because you never know how and where companies are storing your information. If they haven't encrypted your password securely enough and it gets

stolen (as we've seen happen to so many huge sites and services in the last year or two) then everything you use will immediately be at risk, regardless of how secure your password is.

If you struggle to remember passwords, you may want to use a service like 1Password to manage your logins. This will mean you only have to remember your 1Password master login but allows you to use a different password for every service, so you get the best of both worlds. It'll even generate a password for you if you like.

Arguably, it does introduce a risk in that your password safe might be cracked, but it's much easier to keep a password for one service secure than tens of them. Besides which, most password safes will allow you to use 2FA to restrict access even further, so the chance of anyone getting in is very low even if you accidentally reveal the login credentials.

4. Lock Your Devices

One good habit to get into is to lock devices when you're not sitting at them, and make sure you require a password or code to unlock them. This mostly applies when you are in communal situations – using your computer at work, at school/university or in an Internet café, perhaps – but it does also mean making sure your vital information can't be accessed by anyone who may have broken into your house while you're not in, wandered into your room during a party, or opened up your tablet without your knowledge.

Locking a device is important for two reasons: firstly it protects your files, and secondly it protects you from the bad online behaviour of others. Should a device be used for anything illegal in your absence, the authorities and/or owners only have your word that you weren't the one responsible. Even if it's your own system, an unauthorised user might take the opportunity to install malware so they can access your system remotely later on.

You don't have to be a spy to have a computer worth protecting, and when it's so easy to do – if you're using Windows, just press Windows Key + L, for example – it's worth getting into the habit of doing it.

5. Use A Secure Browser

If you're anything like us, the vast majority of the time you spend on your computer is spent inside a browser window. That means keeping your browser secure is analogous to keeping your PC secure. While Internet Explorer has improved its security massively in the last few years, it's still the slowest entry in a three-horse race. Unless you have accessibility needs or software requirements that can't be met by browsers other than Internet Explorer, you should definitely consider switching to Firefox or Chrome, both of which are vastly superior to Microsoft's browser – and typically faster and more standards-compliant too! Microsoft Edge is more secure than Internet Explorer, but the jury's still out as to whether it's better than the others. Certainly, it has fewer features, and that makes it hard to recommend.

As for which of the alternatives is best, it's ultimately hard to say. Chrome is typically regarded as the most secure due to its high volume of security updates – they come nearly twice as often as most browsers – but Firefox is a close second and has a lot more features for both security and other uses.

Whichever you choose, you can always improve security using plug-ins and tools like Disconnect, Blur, DNSCrypt, Ghostery and uBlock, which help anonymise your traffic and prevent interception and tracking by third parties. Most malware gets in through malicious code that can be blocked, so it's worth taking the opportunity. [mm](#)





It's hard to stay off the grid, but you don't have to give information away...

In the era of social media, targeted advertising profiles and hacks dumping personal information onto the web wholesale, staying anonymous online is perhaps more difficult than ever – and maybe more important. When Ashley Madison's contact details were uploaded by hackers, 37 million people found their personal lives effectively exposed – but is it possible to avoid that, and similar things, happening to you?

Maintaining complete privacy on the Internet is hard, if not down right impossible – but certainly there are things you can do to make it a little less damaging to you if (and when) the information you give away gets compromised or tracked back to you.

1. Be Wary Of Giving Out Personal Details

There's a saying that applies to almost the entire Internet these days, which is that if you're not paying for a service, you're the product not the customer. That's true in a number of ways, but in most cases what it means is that Facebook isn't a company that provides a social media service to its users, it's a company that sells eyeballs to advertisers. The more demographic information they can collect about you, the better their product becomes.

For this reason, almost every site you use wants to know as much about you as possible. Where you're from, where you work, what date you were born on, who your friends are – it all creates a profile that makes you more valuable to them.

However, things like your date of birth, the place you went to school and your mother's maiden name aren't just interesting details about you – they're also identifiers that help narrow down a profile to one person. The less you do to put those details out there, the more secure you are.

As a result, it's worth remembering that not every site needs to know your date of birth, for example. Many of them use it as a completely legitimate way to help you verify your identity when you reset a password, or send you a 'happy birthday' email when the time comes, but hackers might not have such innocuous uses in mind – and there's no way of knowing how secure a forum is, especially if they're old or amateur in nature.

Our recommendation is that you pick a memorable date that isn't your birthday to use on the Internet in circumstances where you're suspicious of a site's reasons for needing a DOB. If you want to share your birthday with your friends on Facebook, that's one thing – but posting on an AV forum to ask for advice about a TV, or trying to download a new piece of software? You'll get nothing out of giving the details away then.

2. Keep Your Online Profiles Anonymous

Obviously, if you want to avoid your activity being tracked back to you, you'll need to use a pseudonym online – and that includes your email address. While it's worth having an email address that relates to you



“ If you're not paying for a service, you're the product not the customer ”

personally, it's also worth having a second one that doesn't – one you use to sign up to websites which may not be as secure or reliable as the most popular ones, or which you might only want to use temporarily.

The best way to do this is to sign up for a webmail account using a site like Gmail or Yahoo, and then set the email to simply forward to your existing address. That way you can use it to sign up to sites to prevent your login details there being attached to your main email address, but it also means you can keep using a single inbox despite having two email addresses – something that'll make it convenient enough to become a good habit.

Whether you're making a main or spare email address, it's also worth avoiding information that might lead people to learn extra details about you other than your first and surname.

Avoid attaching things like middle names and the year you were born to your email address in an attempt to find an account that hasn't been used yet, because those details could give hackers or other privacy-invaders the confirmation they need to launch an attack on your privacy.

3. Delete Your Unused Accounts

Perhaps the number one way your personal details can be stolen is via a hack that targets a website's database. If you're active on a website there's not much you can do to prevent such an event but, if you've stopped using a site or only signed up to post or read one thing, it's worth deleting your accounts you've finished using in order to prevent needless loss of data.

The fear is that if you leave your account active, it might remain in the system for years to come. In theory, data protection laws mean your account should be deleted after an extended period of inactivity. In practise, it's surprisingly rare that anyone bothers to prune inactive accounts, especially on smaller sites and forums. If they're not doing that, they're probably not keeping the software they use patched either. That's a dangerous combination.

If you're wondering what sites still have your details on file, you can check your inbox or mail archive for sign-up emails and, in the event that your account is still active, go any manually delete it. This might be as simple as pushing a button somewhere, or you may have to email an administrator to specifically

request it. Either way, it's worth doing. Remember to delete, not simply deactivate. The former removes your details, where the latter simply marks the account as dormant (so you have to verify it to sign in again) but keeps the details on file.

4. Block Your Browser From Sharing Data

Location data is great for sites that want to know where their users are coming from, but it's also great for people who want to know who you are and where you live. A geotagged photo on a social media site can easily reveal exactly where you live to people you'd rather didn't have that information.

As such, you should take great care in allowing sites to track where you are, particularly if you think they might then want to share that information. Disabling location services on your desktop system is always worth doing because there's very little value that can add in the first place, beyond targeted advertisements – and that can easily be done through IP-based geolocation anyway.

You might also want to turn on your browser's 'Do Not Track' options. This is a protocol-level option that can be optionally forwarded to web servers along with a normal HTTP request, telling the server not to track your behaviour within or across sites. It's a completely optional setting and technically isn't part of the HTTP specification even though it's supported by most browsers and servers now. It isn't exactly foolproof – for one, it's completely optional on the server end – but it is better than nothing.

Ultimately it's hard to remain completely anonymous when you're on the Internet – the trick is to be selective about what you share and when. It can be easy to give away much more information than you realistically need to – and that's where the problems start. [mm](#)

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MOBILE SECURITY ESSENTIALS

How can you stay safe when on the move?

Mobile computing has become a huge part of most people's lives, but mobile security? That's taking a while to catch up. While most of us know the basic rules for staying secure online or at home, knowing what to watch out for when we're using our tablets and smartphones is a much different proposition.

For that reason, we've come up with this list of security threats to look out for when you're using your mobile device, as well as what – if anything – you can do to combat them and secure your behaviour.

Data Mining Software

Most apps require a certain amount of information to do their jobs. After all, a messaging app would be useless without access to your contacts, and there's no point trying to use a mapping application if you don't allow access to your location.

But at the same time, not every app needs to access all your data. In much the same way that alarm bells should ring when a Facebook app wants to be able to see your friends' contact details even if it's just a personality quiz, you should be wary of giving apps access to details about you that they probably don't need.

Luckily, most phones are now good enough that you can exercise some granular control over the access different apps have, as long as you make sure you go and turn it off. If an app is requesting access to something it doesn't need to function, chances are that it's harvesting that data for a secondary purpose – and there's no guarantee that purpose isn't malicious. Be vigilant about the data you give away.

Jailbreaking & Rooting

If your phone is locked or otherwise restricted, it can be tempting to jailbreak or root it and use custom-written software to add features that you otherwise can't access.

However, this has the secondary effect of changing the security of a device. Jailbreaking and rooting usually requires genuine security features to be either disabled or circumvented, and custom software to be installed. This doesn't just open existing security holes – it can create new ones.

Jailbreaking and rooting a device is especially dangerous if you're using it to install third-party or even pirated software. There are no checks and controls on programs that originate outside of official channels, so the likelihood that they'll be malicious is considerably higher.

Furthermore, jailbroken devices are often divorced from manufacturer updates so as to preserve the integrity of the modified software. Although the jailbreaking scene normally releases updates each time a new official version of your device's OS or firmware is released, it can take weeks or even months to happen – during which time your jailbroken device is vulnerable to security holes that have already been identified.

Essentially, if you want to keep your device secure, then you'll have to avoid jailbreaking it altogether. That may be disappointing, but it's also true.

Malware Apps

While some apps mine your data as a secondary function, at least they're doing so in a legitimate (if sneaky) way. That makes it easy to disable and uninstall them if you decide the trade-off isn't worth it.





MOBILE SECURITY ESSENTIALS



Unfortunately, mobile malware is getting more and more prevalent. Malware apps can mine data, alter browsing behaviour and even outright steal information that they shouldn't have access to such as passwords and credit card details.

Although iOS devices were, historically, less vulnerable to malware than more open platforms, it has been shown that it's possible to acquire enterprise-level privileges to circumvent App Store controls and get malware onto phones without going through the traditional (and incredibly secure) App Store. Apps based on the WireLurker malware in particular could gain access even to iOS devices that hadn't been jailbroken.

Beating malware of this kind is quite difficult but largely relies on you keeping your software up to date to ensure that security loopholes are closed, and staying vigilant about the source of your apps. Don't sideload them or use third-party app stores unless you're 100% confident of the safety and integrity of the software.

Man In The Middle Attacks

Although most of us have a mobile connection on our smartphones, the cost and coverage issues means that a free wi-fi connection is almost always a more attractive option when it's available. And on mobiles and laptops, it's usually the only option.

But public wi-fi can be incredibly insecure. For one thing, you can't verify the setup of the connection or the integrity of computers using it. In many cases you can't even be sure that you're connecting to an official wi-fi source or a 'honeypot' network set up to capture people and devices.

If a wi-fi connection is insecure, this constitutes a 'man in the middle' attack, because the sender's system is secure, the recipient's system is secure, but the connection between them has been compromised. It allows for real-time monitoring of web traffic and data, which can deliver all sorts of sensitive information to hackers. By stealing cookies and session IDs, they may even be able to gain access to your account without

needing a password or further verification. They could even use DNS servers that direct your requests to insecure login pages without you realising.

There's not a lot you can do to prevent this kind of attack other than avoid public wi-fi completely, but a comfortable middle ground might be to avoid accessing online banking or using your credit card online while you're connected to a public hotspot. Even just temporarily disabling your wi-fi while you conduct a sensitive transaction is better than nothing.

Lost And Stolen Devices

If your tablet or smartphone gets stolen, the financial loss can be irritating, but that shouldn't overshadow the more serious concern: all of your data was on that device. That means passwords, email access and who knows what else.

Obviously, no one plans for their mobile device to get stolen, but there are things you can do to make sure that if the worst happens, you aren't giving your entire identity away with it.

The first is to make sure it has a passcode (or some other security measure) on it. Once your phone is locked, it'll become virtually useless to anyone trying to get data off it without specialist software, and most of the time they'd rather just wipe it and sell it on than persist with trying to break the passcode.

Secondly, installation software that can help you locate a lost device or at the very least wipe it remotely. As soon as the device connects to a mobile or wi-fi data signal, these programs issue a command that cleanses it of all personal data, so at least you'll know it can't be stolen even if it's distracted.

Finally, make a note of the phone's IMEI number. This is a unique identifier, which mobile providers can use to disable the handset at a network level, ensuring that it's useless to anyone who tries to use it once you've reported it as stolen. That won't necessarily secure your data, but it will discourage thieves from stealing handsets in general! [mm](#)





WIRELESS NETWORK SECURITY ESSENTIALS

**Securing your
wi-fi network is
easier, and more
essential, than ever.
Here's how...**

The near-ubiquitous nature of wireless technology, in everything from tablets to games consoles to fridges means that keeping your wireless network secure is more important than it's ever been. Luckily, the days where routers came with their networks unlocked and practically inviting intrusion are long gone; now it's very rare that you find a model that doesn't come with some manner of security out of the box.

Maintaining privacy and security on a router isn't just a matter of leaving it alone, though. It requires active maintenance and a modicum of understanding. Which is where we come in.

Why Have Security At All?

We've already mentioned that wireless routers come with security enabled, but what's so bad about running an unsecured network? On the surface, maybe not so much. You don't have to bother with security settings and passcodes to connect to them, so they're a layer simpler than most networks – and you can find them being used in public all the time. What do you stand to lose by running one at home, then?

Unsecured networks have only one real benefit: they're incredibly easy to connect to. This is also the thing that makes them a poor choice for home use. With no



encryption or security, the data passing through the network is ripe for interception, and can be captured by anyone who cares to do it, and it only requires them to have a working knowledge of some very simple software tools.

On a more practical note, it means that others can use your broadband connection. The consequences range from the minimal (your connection speed will be slowed by extra traffic travelling through it) to the financial (your broadband cap could be exceeded, incurring top-up fees) to potentially severe legal penalties (the person breaks the law using your connection, and it's traced back to your account).

Having no security on your wireless network isn't just a bad idea – it practically invites trouble. While the act of connecting to an unsecured network without authorisation is illegal, there's also a legal imperative for the owner of a network – and that probably means you – to keep it secure. That's why you now have to run a security on your network, and why you shouldn't ever disable it – except temporarily, and only for very specific diagnostic purposes.

WPA Security

If you're running a modern network, you should have WPA (Wi-fi Protected Access) encryption enabled, and specifically the latest and most secure iteration – WPA2-PSK. The 'PSK' part stands for 'pre-shared key' and refers to the 'personal' or 'home' version of WPA where the passkey must be entered by each user to gain access.

An alternative – 'WPA Enterprise' – uses something called a RADIUS server for authentication. As the name suggests, WPA Enterprise is intended for use on large business networks, and is designed to make managing a large number of wireless clients a simpler process, rather than a more secure one.

Most modern routers come with WPA2 already enabled; generally you'll then find the relevant key printed on a sticker attached to the router, or on accompanying card. Although it isn't entirely necessary to change the WPA access key from its default, it can be useful – especially if you're worried that third parties may have access to your router while you're not around.

The best practice for choosing a strong WPA key is very similar to that of choosing a strong

password, requiring similar considerations. When coming up with a WPA key, try to devise one that meets the following criteria:

1. Make It Long

Aim to create a password that is around 12 characters in length. Any shorter than 8 characters will mean that brute force attacks (where software is used to systematically enter passwords from a database containing potentially millions of possibilities) could potentially be completed within realistic time-frame, so avoid those. The more characters you add, the less likely it'll ever be cracked.

2. Make It Memorable

While any string of characters will work as a key, if you seek to make that string memorable to you then you won't have to write it down or save it on your computer in order to use it.

3. Make It Original.

As with passwords, you should ensure that you use a combination of numbers and letters to create a WPA key. Make sure that it isn't made up of real words that could be guessed using a dictionary attack.

Although cracking a WPA passcode isn't impossible, it is time-consuming. If you suspect someone else is attempting to access your router then changing the WPA key will be enough to put them back at square one.

“ Having no security on your wireless network isn't just a bad idea – it practically invites trouble ”



SSIDs Explained

Most wireless networks broadcast an SSID so that they can be identified. This is the name that appears in the list of available wireless connections when you try to connect to one. It's important to remember that while SSIDs aren't specifically a security feature, they do perform a security function of sorts for your network.

Altering the SSID (network name) to something generic is also a good idea. Most ISPs ship their routers with a network name that identifies the service provider, such as 'TalkTalk-5C0A50' or 'BTHub5-FX5W'. This gives anyone attempting to access the router a starting point: they can narrow the device down to one of a few used by that ISP, and maybe even take advantage of any loopholes or exploits that exist in its firmware.

You also shouldn't make it possible to connect your SSID specifically to you, because that could unwittingly divulge things about you that you'd rather people didn't realise. For example, if your SSID contains your address and you switch the router off while on holiday, people might notice that it's missing and realise that your house is empty. If you use an uncommon name or online handle as your SSID, further details about you might only be a Google search away.

Changing your network's SSID to something random, which doesn't identify either you or the hardware, is a good way to keep your network secure, and it shouldn't affect your day-to-day access either.

Some places suggest that you disable the SSID broadcast so your network doesn't show up in lists of available networks, perhaps believing that you need to know the name of the network to connect to it. This isn't the case, however. It's a trivial matter for anyone to connect to a network without the SSID.

Disabling SSID broadcast may prevent the network from appearing in adaptor lists, but the SSID still exists as part of the traffic being broadcast and isn't encrypted, so it can quickly be found by using very basic network-monitoring software to intercept wireless signals. No

Wireless Security FAQ

If you have any questions left about wireless security, hopefully this FAQ will answer them for you!

Does it matter whether my device uses 2.4GHz or 5GHz?

Although speed and signal strength can vary depending on whether you use a 2.4GHz or a 5GHz-based network, the security on both are the same. There's no significant difference between Wireless N and Wireless AC security either – these protocol changes are almost entirely about speed rather than any other quality.

Is it illegal to use an unsecured wireless network?

It's not illegal to run one (though it isn't very smart). As for whether it's illegal to access one? That entirely depends on the answer to one question: do you have authorisation?

If it's a public wi-fi network that you've been invited to use, then yes, it's fine. It's not necessarily very secure, but it is legal. If it's a neighbour or business that has simply failed to correctly set up their wireless security, then no, it's absolutely not legal.

Specifically, you could be charged under either the Computer Misuse Act 1990, which makes it a criminal offense to gain unauthorised access to a computer system, or under the Communications Act 2003, which states that someone who 'dishonestly obtains an electronic communications service [...] with intent to avoid payment of a charge applicable to the provision of that service' is guilty of an offence.

What if I forget my WPA key/router login details?

If you forget your WPA key, you can connect a computer directly to your router using an Ethernet cable and change it that way, since a wired connection requires no security key. If you are unable to do this, or have forgotten your login details, your only option is to perform a factory reset on your router. This will return it to the default settings, but it'll also wipe any other details you've input, so only use it as a last resort option!

“ Whitelists are tedious to maintain, and as a security measure they're only nominally effective ”

semi-determined hacker will be deterred by an SSID broadcast being disabled, and ultimately it's more likely to frustrate you rather than any potential attackers – if nothing else, you won't be able to easily tell whether your network is down based on its visibility, and may have to manually check the SSID before connecting new devices – a lot of inconvenience in exchange for effectively no extra safety.

MAC Whitelists

One piece of security that you may see recommended is a MAC whitelist. Any piece of hardware with a network connection has a unique MAC address, which identifies the specific piece of hardware that a network connection is coming from. Everything from your network card to your PlayStation 4 to your smartphone

has its own MAC address which, in theory, is utterly unique.

A MAC whitelist will restrict network access only to specific MAC addresses, and can therefore provide an additional layer of security for your network by preventing access to unknown devices. One of the benefits of using a MAC whitelist is that it can be combined with other security protocols, since the authentication occurs at a different level to encryption keys such as WEP and WPA.

However, whitelists are tedious to maintain, and as a security measure they're only nominally effective. It's trivial for a hacker to intercept your network traffic and change (or 'spoof') their network device's MAC address to use one on the whitelist, allowing them access. MAC whitelists deter only the most casual attackers, and less effectively than a WPA key can.

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In practice, whitelists aren't really about security – they're about device management. Access points usually allow you to name the devices on a whitelist, so you can use it to double-check what's connected to your network, and when.

Traffic Filtering

Although filtering hardware isn't much help in securing a network, filtering traffic is virtually essential. By default, most routers screen out unwanted traffic from the Internet so you don't have to run a separate firewall on any device connect to the Internet it, but it's worth knowing what's actually going on.

One thing that firewalls may do is prevent genuine traffic from being sent in and out of your network. If you want to test this, the best way to do it isn't to disable the firewall completely (which puts every device on your network at risk) – it's to use the DMZ capabilities of your router.

The name of a DMZ server has little actual meaning – it's a reference to an unprotected 'demilitarised zone', but if you put

“ **If you put in your system's IP in at the DMZ server your firewall will allow all traffic in and out** ”

in your system's IP in at the DMZ server your firewall will allow all traffic in and out. This puts it at the mercy of the Internet, but is a good way to check whether your firewall is causing connection problems. It shouldn't be used for any extended period, though, unless you have a really good reason. When your testing is complete you should disable the DMZ server to ensure your system security.

Rather than using a DMZ server to allow specific connections through you firewall, the ideal case is that you'll use port forwarding instead. Ports are like virtual 'sockets' used by all IP-to-IP connections. All standard HTTP traffic goes through port 80, while standard FTP traffic goes through port 21, which helps prevent FTP servers trying to listen for HTTP traffic and vice versa.

Normally, a router's firewall will block unsolicited incoming traffic on any port, but port forwarding allows you to ensure that connection attempts are routed to a specific IP address on your LAN – useful if you're running a file server, for example, and want to ensure anyone trying to connect to your WAN IP reaches the FTP server on that computer.

Most modern routers forward ports using UPnP functionality, which turns port forwarding on and off when it's needed, but some networks and programs may require you to set it up manually. In general, if you're not having problems, you don't need to touch anything.

Hopefully, having this information means you now feel better equipped to manage your wireless network security. Don't be intimidated by it! [mm](#)

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UNDERSTANDING AND AVOIDING SOCIAL ENGINEERING

Often the best way to get into a network or computer is via its users...

When it comes to computer security threats, there's been a big change in over the last decade or so, which has seen the point of attack change from a system itself to the person operating it. After all, anti-viruses are difficult to circumvent and security patches are applied frequently – but the person behind a computer is, generally speaking, as easy to fool as they've ever been.

Any attack that targets the human element of a system instead of the computer itself is said to use 'social engineering'

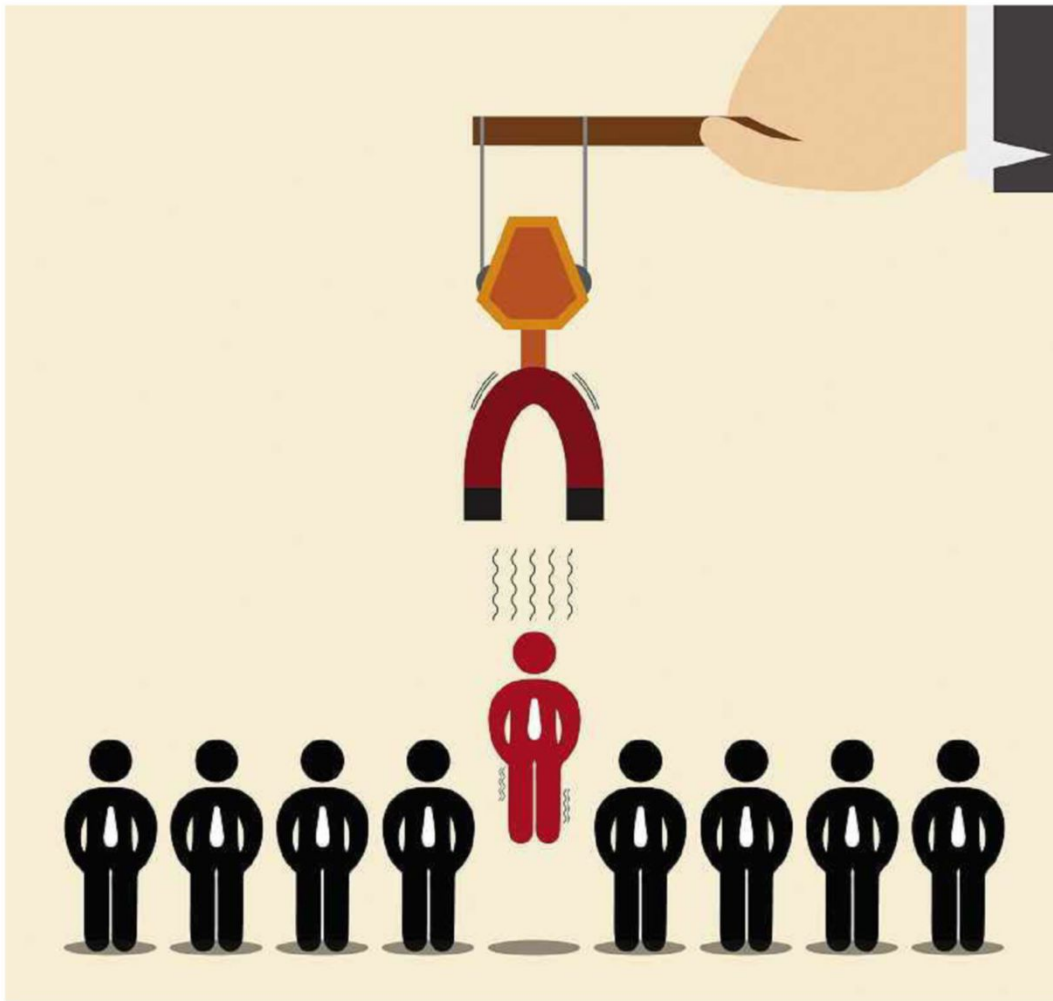
to get what it wants. What this means is that it succeeds by targeting people's trust and willingness to believe they're being helped – that is, your social skills – rather than by targeting technical loopholes.

Examples of social engineering include anything from a malicious website popup trying to trick you into revealing your passwords 'for security reasons', to a postal letter asking you to complete a survey filling out confidential details. It may not happen on your computer, but wherever it happens it abuses people's trust to get information attackers need.

The form of attack is popular because systems can be instantly reconfigured to blacklist websites, block filetypes and filter out emails, but it can take years to educate people once a threat becomes common. The sheer scale and apparent success of the Microsoft Tech Support Phonecall scam is a good example of that: rather than exploiting a security hole that could be closed in seconds once a fix was found, the scam works by tricking people into manually installing malware for the attackers. Years after it was

first revealed, it continues to succeed often enough that the scam hasn't yet died out.

The rise in prominence of 'ransomware' is another good example of how social engineering has been a success for hackers. Rather than relying on a mechanical search for credit card details like early viruses might have, or employing a discreet keylogger to hide on your system and wait for the information it needs, ransomware throws itself in the user's face saying 'pay now or your data will be gone forever', playing on fears and anxieties to extract your money.



“ You simply have to be on guard: don’t click links that look suspicious, especially if there’s no accompanying text ”

So if social engineering is a problem that’s getting worse, what can you do to avoid it? One thing is to learn what types attacks are common, and how to combat them.

Financial Attacks

Perhaps the easiest type of attack to avoid – but one which is popular for how lucrative it can be – is the kind in which someone contacts you and flat out asks for money. This might be well-known in the form of the famous ‘419 scam’, in which you’re asked to pay money to gain access to lots more – but increasingly, such contact *appears* to come

from someone you know. This impersonation may be a result of someone stealing or spoofing your contacts, or it may be because they’ve gained fraudulent access to a friend’s account. Either way, once the criminal has a way to impersonate one of your friends online, they’ll use that ability to contact you and begin a scam.

The simplest of these will have a link in the form of a ‘worm’ – something you’re invited to click, which turns out to be an advertisement, or worse, a malware-delivery site. Once you click the link your own profile and/or

personal information may be compromised, and in the worst cases it’ll take this split-second guard drop to spam your contacts with the same type of thing, too.

To avoid this sort of attack, you simply have to be on guard: don’t click links that look suspicious, especially if there’s no accompanying text. Asking for clarification is always worth doing because if your friend didn’t plan to send the link, they’ll realise and tell you – and if they did, you’ll have a better reassurance that it’s genuine.

In more complicated circumstances, the attack

might involve your ‘friend’ asking for help. They might request that you send them money because they’re stuck somewhere and have run out. They might claim to be stuck in a foreign prison and require cash for bribes or bail. If they’re a bit more subtle, they might ask you to donate to a charity campaign or other good cause.

The important thing in these cases is that you don’t send any money through services that might be suspicious or unfamiliar. There are plenty of familiar services they can use to send and receive money, and if you’re really not sure whether it’s genuine or not, suggest one you’ve researched yourself and which you know has protection. If they’re dead set on using one particular site, there’s a good chance it’s part of a scam.

Password Phishing

Very similar to email scams, phishing attempts use e-mail, direct messaging and other forms of communication to steal your passwords or personal information, rather than money. The term phishing originally applied to a telephone-based scam, but it quickly spread to emails and IM with the advent of the Internet.

Many of us think nothing of receiving the occasional email from a social media site, so when one arrives purporting to be a notification of some kind, it’s easy to trust it. Scammers exploit this trust by imitating emails from social media sites and online organisations, then sending fake notifications claiming that you’ve been friendied or tagged, or in an extreme example of bare-faced cheek, had your account compromised. Often, this will be accompanied by a message designed to set off a panic response, such as ‘Have you seen what this person has been saying about you?’ or ‘You must act urgently’ – the idea being that when

panicked, you're more likely to click first and question later.

When you click the link, you'll probably get taken to a login screen, that will hijack your details and use them to post spam messages or retrieve your contacts, and may even lock you out of your account. Some variants encourage you to download an attachment containing your message, which will actually be zip file containing a Trojan, allowing external parties to control your PC.

One way to easily remove any doubt is to turn off all email notifications. That way, even if you get an email that looks like one, you'll know it's false and can just ignore it completely. However, if you don't visit sites frequently enough to make that a viable option, or actively want the notifications, the alternative is just to be careful before you click anything. Follow standard phishing protocol: check the target of any links you click on, and if in doubt, visit the website manually and look for the message there, rather than simply believing it's genuine.

If you get stung but still have control of your account, changing your password should be enough. If you find yourself locked out, you can try account recovery by answering your security questions, but there's a chance whoever controls your account will have automatically changed them. If that happens, get in touch with the support team and explain the situation, and they should be able to return control of your account to you.

Mobile Attacks

Mobile security is a relatively new area, especially because mobile devices work in a completely different way to most traditional computing platforms. You're probably used to receiving spam phonecalls, but it's worth remembering that malware is

likely to come to your phone eventually – and when it does, it'll probably be because you allowed it access.

After all, the first ever mobile virus – the Cabir worm – required users to manually accept the transfer of the worm onto their phones, but that didn't stop it getting about. Users happily accepted a Bluetooth application transfer from a completely unknown source, then ran the software that was delivered. The mobile malware of the future will almost certainly require users to be complicit in their own infection at some level.

An infected mobile device brings with it obvious new

avenues to exploit. Gone are such rudimentary tactics as serving adverts and tracking webpages – modern mobiles track everything from where you visit to when you sleep to how many times your heart beats a minute – data that any sufficiently maniacal advertiser would salivate over. Direct theft is also easier, thanks to NFC and wallet-based payment systems. It's not beyond the realm of possibility that malware in the future could use your mobile phone to try and make payments without your authorisation.

In the worse cases, your mobile might even become complicit in a real-world

theft. It would only take a rudimentary amount of access to make a smartphone alert a third party when you've left the GPS location it understands to be your home, informing them that the building might therefore be unoccupied and vulnerable. This is social engineering taken to the extreme level, where even your otherwise normal behaviour gets weaponised against you, simply because you let your guard down once!

How To Avoid Social Engineering Attacks

Most forms of social engineering can be defeated using the same tactics, and you don't even have to be suspicious to employ them. Most are just good behaviours to learn generally!

1. Slow Down

Social engineering works by tricking you into acting before you have a chance to think. If a message claims to be urgent, or gives you a time limit in which you must respond, there's a good chance they're trying to make you click on something or offer some information before you realise it's a bad idea.

2. Do Your Research

It's always worth being sceptical of unsolicited messages, no matter what they're claiming. If an email purports to be from a particular company, don't just follow the link inside it. Go to their website and see if the claims they make stack up when you log into your account manually. If you're not sure if it's genuine, try searching for the email or company with the word 'scam' in a search engine to see if other people are getting the same requests too.

3. Hold On To Confidential Personal Information

This applies in real life as well as on the Internet. If someone wants a password, or your bank details, or

“ **Social engineering works by tricking you into acting before you have a chance to think** ”



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information that you have to dig up for them, you should be suspicious. Phone scammers are keen on ringing up, claiming to be your bank, and then asking you for the answers to basic security questions. Clearly, they could be anyone, so take a name and number, offer to call them back, and then plug them into Google to see how legitimate they are before you do.

4. Reject Offers To Help

The tech support phone scam succeeds because it's two-fold: they tell you there's a problem, and then they tell you they can fix it. If you hadn't noticed a problem on your system before they got in touch, that probably means there wasn't one – though if you follow their instructions there soon will be. Legitimate companies will probably help you, but they'll only do so if you ask them. Unsolicited offers of help are often attempts at running a scam, so be cautious. Again, if you're unsure, get the company's contact details from their website and then call them, rather than trust that they are who they say they are when they phone you up.

5. Sound Too Good To Be True? Then It Probably Is

Some scammers prey on people's hopes for good news. It seems almost obvious to say, but any message informing you that you've won a lottery or sweepstakes you didn't enter is trying to exploit you. Similarly, any unknown relatives or foreign officials asking for your help are too. The 419 scam, which involves sending people a small amount of money to help unlock much more might seem transparent, but it catches out enough people that they still turn up in spam emails even now, years after they became popular enough to openly mock on panel shows.

6. Keep Systems Protected

When it comes to scams of any kind, software is your closest ally in making sure that websites are what they say they are, that attachments aren't harmful, and that emails are genuine. Your anti-virus doesn't necessarily have to be paid-for, but it should be kept up to date. Leave browser settings on their default security levels (at least) and make sure your email spam filter works well. Even if you're tricked by social engineering scams, a well-configured system will be able to intercept them before it becomes an issue.

If all that sounds like a lot of work, you don't have to worry – the more you do it, the more

“ If you hadn't noticed a problem on your system before, that probably means there wasn't one ”

it'll become second nature, until eventually you don't realise you're doing it at all.

The good news is that, on some levels, the increasing reliance on social engineering might actually be cause for celebration. If computer security has become so effective that it's now less effort to manipulate people than software, then that means honest computer users are only a few steps away from a huge victory. To

stop social engineering from working, all the industry has to do is educate people about it, and make it as difficult to exploit users as it is to exploit their machines.

While that's easier said than done, perhaps, at least it's a goal that feels like it could be achievable. It's unlikely malware will ever completely go away, but between more secure systems and better-educated users, progress is definitely being made. [mm](#)



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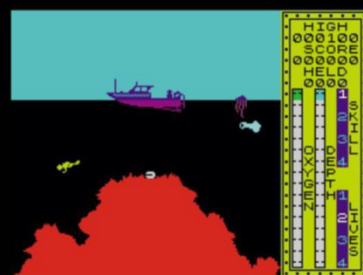
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PASSWORD MANAGEMENT GUIDE

How do you make sure your password is strong enough to keep your data safe?

Whether you want to receive an email, check your bank account or even log onto your PC to begin with, the reality of modern life is that you're going to be typing in a lot of passwords every week, if not every day. No matter how little time you spend on the internet, you can be virtually guaranteed that you'll have to enter, create, remember or reset a password to do at least one thing.

This fact means that, for obvious reasons, most of us do things that are considered bad practice by any security advisor worth their salt. We reuse passwords on multiple services. We use weak passwords because they're easier to remember. We write them down so we don't forget them.

For obvious reasons, doing these things is almost enough to make passwords useless. But what can you do to break these habits? We have a few tips that might just help.

What Makes Passwords Weak?

Conventional wisdom holds that the strongest passwords contain a selection of numbers, upper and lower case letters and even punctuation, with a length of around eight to 14 characters. But what's the logic there?

The criteria these passwords are trying to fulfil are simple: they need to be unguessable, and they need to be nearly impossible to reach through dictionary/wordlist attacks or

enumeration alone. Even if you only mix case, letters and numbers, a five-letter password could be any of 8.5 billion combinations. Most systems demand at least eight letters, which would take years for a single computer to guess methodically, even if it knew that your password is eight letters long.

Most systems won't even let you use a password that doesn't fulfil those criteria, of course. The problem is that they also don't know when you've used a password on another system. If one system gets cracked, they can all be compromised.

Worse still, if they let an attacker into your email account, every account associated with it can be compromised too, since that's

the primary method of verification for most online services. Essentially, even the strongest password becomes weak if you use it more than once.

The way around this is to make sure you use a different password for everything you do online, but that's a problem because it makes them hard to remember. Inconvenience doesn't encourage good security. Writing them down means they can be stolen. If you can't remember your passwords, then again they get weaker.

If all that sounds like you've been backed into a corner where you need to have a weak password unless you're some kind of memory master, there is at least one thing you can do: use a password manager.

Why Use Password Managers?

Password managers essentially give you the best of all worlds. Your passwords can be strong and uncrackable, but you don't have to remember them, so you never have to reuse them or store them insecurely either. In return, you replace a lot of this danger with two smaller risks: that you'll lose access to your password manager (but you can still reset the password manually) or that someone else will gain access to your password manager (you just need to choose a sufficiently strong password, and at least you only have to remember that one).

Password managers usually involve browser plug-ins that auto-fill forms for you, so in that sense it's very much like using passwords normally is, with the extra benefits of them being stored securely (rather than quite insecurely, in your browser and cookies) and that they're (usually) kept in the cloud so you can access them from any device or system with an internet connection. If you want to block access to the passwords temporarily, you can simply log out of the manager.

Most major web browsers do store passwords for you, but these are largely not very secure and certainly not encrypted, which



“ Password managers essentially give you the best of all worlds. Your passwords can be strong and uncrackable, but you don’t have to remember them ”

means anyone with the right know-how can get at them. Password managers also have additional features such as automatic generation and anti-phishing features.

Once you’ve chosen and installed a password manager, it’s important that you don’t simply populate it with your current passwords, as these will still be unsecure. Instead, you should generate new passwords for every service so they’re all strong and unique. Some services, such as LastPass, have a ‘security challenge’ that tell you which passwords need changing.

Most password managers can also store other commonly used but sensitive information such as credit card numbers and addresses. Like a password, this information is held in the cloud and encrypted so no one can access or steal it without your master password.

Which Password Managers To Use

There are several major password managers that you can check out if you’re interested in making the leap to a more secure password system. Most of them have similar features, but in case you’re interested in which is right

for you, we’ve put together this quick guide to the most popular.

LastPass (lastpass.com) is a cloud-based password manager, which has browser extensions, mobile apps and even a desktop app compatible with all major operating systems. As well as having a huge number of features, it has two-factor login authentication, so your passwords can be made even more secure. Passwords are stored, encrypted, in the cloud and are downloaded and decrypted locally, so even LastPass can’t see what your passwords are! If you don’t know where to start, we’d suggest beginning with LastPass; it’s the complete package, and it’s only worth moving on if you don’t get on with it fairly quickly.

KeePass (keepass.info) is an ideal choice for anyone uncomfortable with cloud-based password managers, being as it is a desktop-based local solution. There are browser extensions and mobile apps, but your passwords are ultimately stored on your computer rather than on the internet. It’s an open-source project so maybe not quite as slick as the likes of LastPass, but this also

keeps it honest. There are no back doors in this code, because everyone would be able to see them! The only downside is that if you change or update passwords, you have to sync them manually. You can use something like Dropbox, but by that point you might as well be storing them in the cloud anyway! We recommend KeePass for users with only one PC to manage or those who don’t trust internet-based services to remain both safe and available.

Dashlane (www.dashlane.com) is a newer password manager than the other two, but it’s comfortably cross-platform with apps for lots of different devices and operating systems. It also has extensions for every major browser and a built-in dashboard that analyses your password strength and helps you change them. It can even automatically change your password for you, on popular and supported services. A slight problem is that it’s a premium service, which you have to pay to use on multiple devices, but it’s free on one, so you can at least test it out before parting with any more. One good thing is that you have the choice of whether to keep passwords locally or in the cloud, so you get the best regardless of your preference.

Hopefully, we’ve convinced you that good password managers can be beneficial to your security. And to be honest, when passwords are this difficult to manage, anything that makes it easier has got to be worth trying out! **mm**



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Introducing Sonic Pi

David Briddock explains how to play code-generated music with Sonic Pi

Are you fascinated by making music but can't play an instrument? Well, with Sonic Pi you can develop your musical skills, compose your own unique compositions and maybe become the next Kraftwerk, Daft Punk or will.i.am.

Created by Sam Aaron (twitter.com/samaaron) at the University of Cambridge, the Sonic Pi home page (sonic-pi.net) describes the app as, "a free live music coding synth for everyone."

Originally designed to support computing and music lessons within schools, its creative potential has a much wider scope than education. In fact, Sam Aaron himself uses the app for live, code-generated musical performances (more on this capability later).

Let's explore what Sonic Pi version 2.7 has to offer.

Setup

As you might expect from the name, Sonic Pi it runs on the popular Raspberry Pi computer. But it also runs on Windows and Mac OS X, so pretty much anyone can download the app and have a play.

For Raspberry Pi owners running the latest Raspbian Jessie operating system (raspberrypi.org/downloads), the Sonic Pi app is pre-installed and available from the main menu. For older Raspbian versions, just follow the instructions on the Sonic Pi download page (sonic-pi.net/#rp).

If you don't have a speaker attached to your Pi's audio jack port, just plug in a pair of headphones instead.

The website has similar app download and install instructions for Windows PC owners (sonic-pi.net/#windows) and Mac OS X (sonic-pi.net/#mac) devotees.

Workbench

Start up Sonic Pi to view its music workbench interface. Across the top there are a collection of buttons with colourful icons. The rest of the display area is divided into two main panels.

The large left-hand programming panel is where we'll enter the music code. Across the bottom there are ten 'buffer' tabs. This means we can have ten closely related or entirely separate musical experiments on the go at the same time.

The size of the code text font in each buffer is controlled by the Size+ and Size- buttons. While the Align button automatically indents the code in a buffer, as correctly indented code is much easier to read and understand.

All the buffers are saved automatically, so we won't lose anything. But we can also archive a particular buffer's code to a file using the Save button.

Over to the right there's the log panel. When running code, this panel displays a list of sound generation events as they happen in real time.

Click the Help button to display a comprehensive help contents across the bottom of the Sonic Pi window. It contains dozens of tutorials and code examples plus a complete list of synths, samples, effects and keywords.

Basics

The Sonic Pi scripting language is designed around a set of simple and intuitive music-centric commands. The syntax might look familiar to those with experience of scripting languages like Python. In fact, it's based on another

popular programming language called Ruby (see boxout).

Time to play some music. Enter the following code into the first buffer tab:

```
play 60
```

Click on the Run button at the top of the screen to hear a C note in the speakers (or headphones).

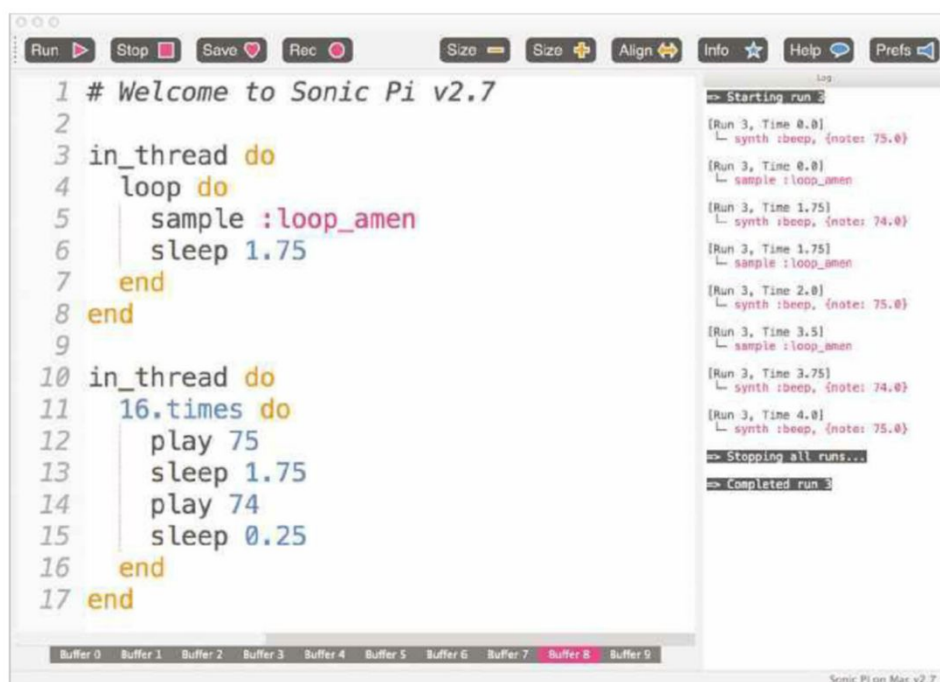
Each number relates to a MIDI note, a global standard for electronic musical instruments. MIDI defines the D note as 62, because it's two semitones above a C. So to play a D, we'd enter this command and click Run:

```
play 62
```

Did you notice that as you typed a list of valid commands popped up? This 'intelligence' style of input is extremely useful when starting out and should help reduce typing errors.

What happens if you do enter something Sonic Pi doesn't understand – for example, 'pley 60'? Well, after clicking the Run





▲ Sonic Pi workbench

button, you'd see an error message appear instead of hearing the note. It's pretty easy to spot and fix the problem as the line with the error is highlighted.

Tunes

To play a tune we'll need a series of notes. We'll also need to specify the length of each note, otherwise they'll all play at once. A simple way to do this is to add sleep commands, which pause script execution for a defined number of beats.

Using a series of numbered notes and half-beat sleep commands, we can play a simple tune. Let's choose something that's easy to recognise: Twinkle Twinkle Little Star.

Enter the following lines into the first buffer tab:

```
play 60
sleep 0.5
play 60
sleep 0.5
play 67
sleep 0.5
play 67
sleep 0.5
play 69
sleep 0.5
play 69
sleep 0.5
play 67
sleep 1
```

Click the Run button to hear the familiar tune.

Alternative Note Names

However, not everyone wants to enter and read a collection of numbers. Fortunately, there's an alternative method of specifying notes. With Sonic Pi, a note can also be described by its musical name and the octave number. For example, the middle C on a piano is defined by the following code:

```
:c4
```

Twinkle Twinkle Little Star uses the notes C, G and A. So let's enter the following into a new buffer tab:

```
play :c4
sleep 0.5
play :c4
sleep 0.5
play :g4
sleep 0.5
play :g4
sleep 0.5
play :a4
sleep 0.5
play :a4
sleep 0.5
play :g4
sleep 1
```

Hit the Run button to hear the tune.

Note Patterns

This certainly looks more musical, but there's quite a lot of code required just to play the first line of the tune. Is there a more concise way of expressing these notes?

There is. We can use a feature called patterns. With a pattern, a series of notes is placed into a list-like collection.

Here's a Twinkle Twinkle Little Star pattern example:

```
play_pattern
[:c4, :c4, :g4, :g4, :a4, :a4, :g4]
```

Notice when running this code the default tempo is a little slow. To control the tempo we can use a pattern variant, like this:

```
play_pattern_timed
[:c4, :c4, :g4, :g4, :a4, :a4, :g4],
[0.5]
```

An interesting pattern feature is the ability to play the notes backwards, a technique used in some classic songs from the Beatles and others. It's done by adding a 'reverse' directive like this:

```
play_pattern
[:c4, :c4, :g4, :g4, :a4, :a4, :g4].
reverse
```

Chords And Scales

Musical chords are made from a specific pattern of notes. For example, a C major chord is formed by the notes C, E and G. And a C minor is C, E flat and G. These chords can be played at different octaves up and down the piano scale.

It's easy to play a chord in Sonic Pi. Enter this command to play the third octave E chord on a piano scale:

```
play chord(:e3)
```

To play the E minor chord, enter this variant form:

```
play chord(:e3, :minor)
```

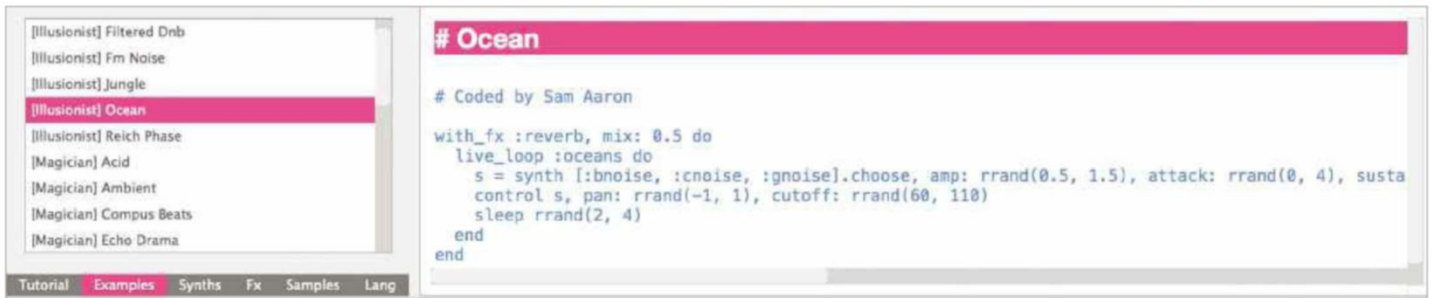
Using this form we can play all the major and minor chord variants such as seventh, diminished, dominant, suspended and so on. Check out the help pages for more details.

And what about arpeggio chords, where the notes are played in sequence? Well, that's easy too. Just enter a slightly modified command as below:

```
play_pattern chord(:e3, :minor)
```

We can play a scale using the pattern command. Scales can be in any key and over more than one octave. Here's a three octave example:

```
play_pattern scale(:d3, :major,
num_octaves: 3)
```



▲ Sonic Pi help

◀ Sam Aaron giving a Sonic Pi lecture

(brkbrkbrk.com), who found success using the thin, tinny tones generated by the sound chips inside 1980s and 1990s games consoles and PCs.

Effects

Musicians typically use a wide variety of studio effects (FX) units. These enhance basic tones with reverberation, echo, distortion, compression and so on. Guitarists use FX units to generate a virtually infinite palette of tones.

Each FX unit has an adjustable set of parameters, and two or more effects are combined together to form an FX chain.

With Sonic Pi, it's easy to add a single FX or create a multiple-FX chain. The code below includes both echo and reverb, with a phase parameter for the echo FX:

```
loop do
  with_fx :echo, phase: 0.25 do
    with_fx :reverb do
      with_synth :tb303 do
        play :c3, release: 0.5
        sleep 0.75
      end
    end
  end
end
```

Notice how the FX parameters are defined in a similar way to synths and samples parameters.

Multi-Part Tunes

Unlike simple nursery rhymes, most songs are composed of multiple parts, such as bass, rhythm and melody. All these parts are played simultaneously to construct an audibly stimulating composition.

How can we achieve this with Sonic Pi? Well, the trick is to put each part into its own runtime thread. Click Run and all these threads are played at the same time.

Enter this simple example:

```
in_thread do
  1 loop do
  2 sample :loop_amen
```

There are quite a few scale variants, such as pentatonic (which has just five notes). And this scale feature is very handy for anyone learning to play a musical instrument.

Building Loops

Many popular songs are constructed with repeated musical phrases, so Sonic Pi has a number of looping solutions. One method is to define a numbered loop, where the loop is played a specific number of times. To hear a well-known French lullaby, enter the code below:

```
2.times do
  play_pattern [:c4,:d4,:e4,:c4]
end
```

An alternative technique entails an endless loop. The following code plays the pattern until the Stop button is clicked:

```
loop do
  play_pattern [:c4,:d4,:e4,:c4]
end
```

Synths And Samples

Up to now we played everything with the default tone. However, Sonic Pi has a whole bunch of synthesiser sounds and pre-recorded samples. Let's look at the synth command first. Enter the code below into a new buffer and click Run:

```
synth :prophet, note: 70
```

Quite a difference! But there's more. Just as with a real synthesiser there are a number

of sound-changing parameters to fiddle with. These include the amplitude, attack speed, release speed, cutoff, stereo pan and more. Pop open the help panel to investigate all the options.

Try this example:

```
synth :dsaw, note: 70, amp: 1.5,
attack: 3, release: 6
```

We can play music using a synth sound with code like this:

```
use_synth :supersaw
play_pattern [:c4,:d4,:e4,:c4]
```

Alternatively, we could construct a synth loop, as here:

```
use_synth :hoover do
  play_pattern [:c4,:d4,:e4,:c4]
end
```

Sonic Pi also has a large list of pre-recorded samples: bass, percussive, guitar, electronic, ambient and many more. Here's an example of a looped sample:

```
4.times do
  sample :loop_amen
  sleep 1.75
end
```

For a full list of synthesiser and sample commands, take a look at the synth and sample areas of the help pages. Many of these synths and samples have a distinctive retro feel, so it's possible to emulate chiptune artists like Pixelh8 (pixelh8.co.uk) and 2xAA

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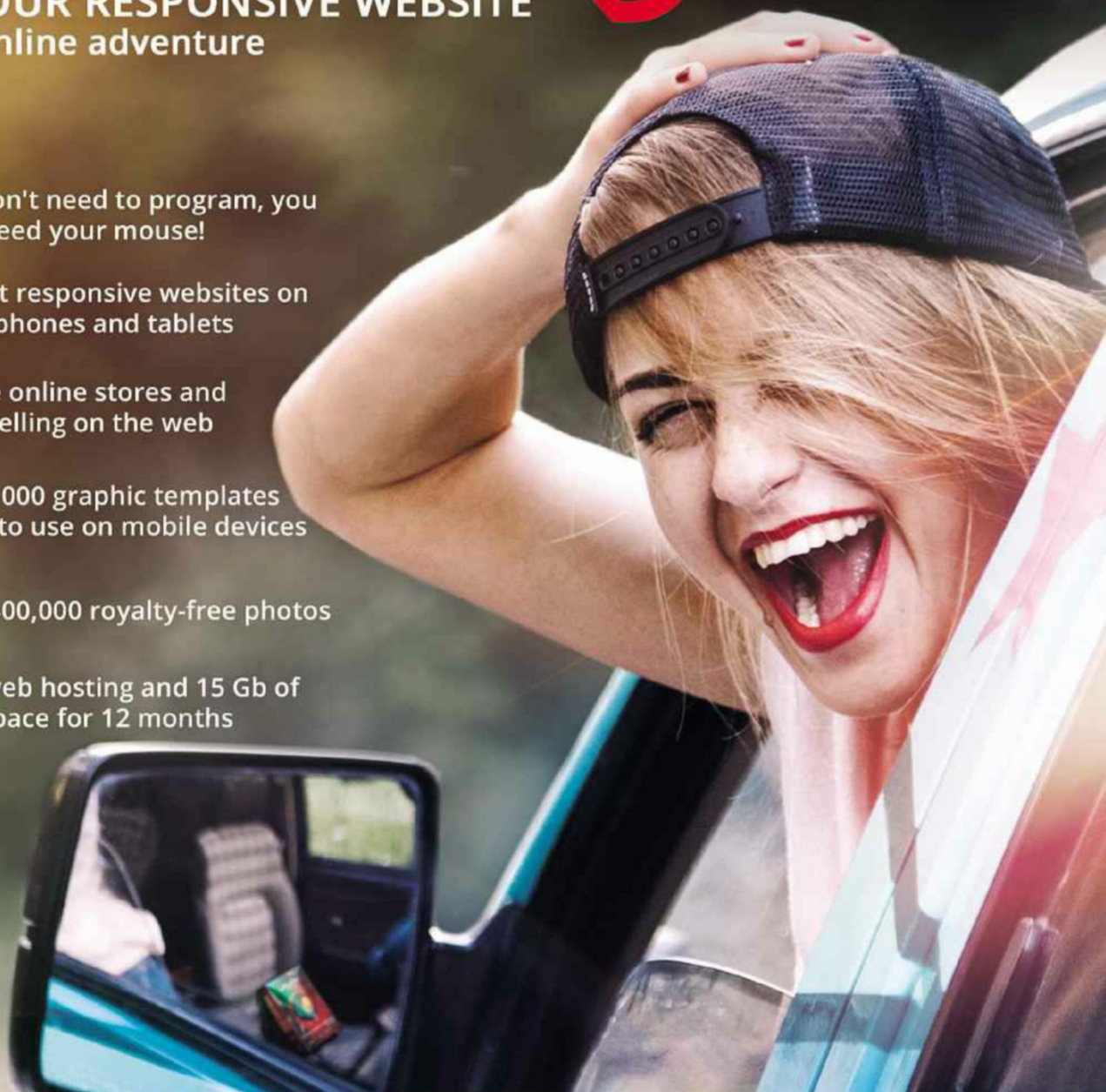
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```
3     sleep 1.75
4   end
5 end
6
7 in_thread do
  use_synth :hoover
1   16.times do
2     play chord(:E3, :minor)
3     sleep 1.75
4   end
5 end
```

When running you'll hear the background beat (as generated by the first thread) overlaid by an E minor synth chord (as coded in the second thread loop).

Live Coding

One of the most exciting aspects of Sonic Pi is its live coding capability. Here code is added, modified and deleted in a real-time, unscripted, experimental manner.

This capability has precipitated a new phenomenon called performance coding – a musical performance where the ever changing code is projected onto a big screen, and where the speed and expertise of the code artists are just as important as the soundscapes they generate.

Live coding is a powerful Sonic Pi feature and lots of fun. Yet from the coding perspective, it's based around a straightforward loop-based syntax.

Each live loop is given a specific name. Try the example below, which has a live loop called 'keyboard' (notice the cutoff is set to a random value – another cool Sonic Pi feature):

```
live_loop :keyboard do
  use_synth :prophet
  play :c2, release: 8, cutoff:
  rrand(70, 130)
  sleep 8
end
```

You can define as many live loops as you like. Each one can be tweaked individually throughout a performance or as part of a freely flowing experiment to get exactly the sound you're after.

For a little inspiration, why not check out live performance coding music bands like Meta-eX duo (meta-ex.com) or the aa-cell duo of Andrew Sorensen and Andrew Brown (goo.gl/kbpdvvg).

Recording

After playing around with Sonic Pi for a while, you may create something you're particularly proud about. At this point, it might be nice to share your creation with family and friends.

Sonic Pi has a Record button to do just that. Click it to start recording, run your code, then click Record again to stop. A

Ruby

Popular among web developers Ruby is a fully featured scripting language with the same kind of power and flexibility as Python.

Just like Python, the syntax is easy to read and understand. In fact, many people find they're able to get to grips with the basics over a weekend. To find out more visit the official Ruby website (ruby-lang.org).

dialogue box then pops up to save the audio to a high-quality WAV file on your Raspberry Pi or PC.

Of course, you might have had some business-centric or self-promotion goal in mind all along. Maybe a backing track for your band, an electronic demo track to send off to a record company or code that generates soundtracks for games, films or adverts.

We've only scratched the surface of what's possible with Sonic Pi. For instance, we've only hinted at the powerful randomised capabilities and haven't begun to explore how whole sections of music code can be contained inside callable functions.

So download Sonic Pi, write some code and enjoy the musical ride. [mm](#)



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Five Great Free-To-Play MMORPGs

David Hayward looks at a handful of his favourite online games

The MMORPG genre has become one of the most successful gaming experiences in recent years. With millions of players worldwide and with revenues well exceeding billions of pounds, it's little wonder the genre shows no signs of slowing down.

Within these virtual lives, gamers can become anyone they want. From sailing the seven seas as a pirate captain or roaming a post-apocalyptic world as a lone warrior, to navigating the stars as a smuggler. They are, in general, great fun to play and can be remarkably absorbing, pulling you into their digitally created worlds while you either team up with or go against other players from anywhere in the world.

Here are five of our current favourite free-to-play MMORPGs.

1) DC Universe Online

Our first place MMORPG is without a doubt *DC Universe Online*, published by Sony Computer Entertainment and developed by Daybreak Games.

DCUO is an extraordinary free-to-play, open world MMORPG where you can take on the role of a caped hero or villain in the DC Comics

universe. You can customise your character: male or female, what type of powers they'll possess, how they'll move around the world and who their mentor will be.

Choosing the likes of Superman, Batman or Wonder Woman will put you on the side of good, battling with other Justice League



▲ Become a super-powered hero or villain in *DC Universe Online*



▲ *Skyforge: become a god*



▲ *Hither came Hayward, sword in hand, treading the jewelled thrones of the earth under sandaled feet!*



▲ *Use the Force and take on the Empire*

members to stop the villains of Metropolis and Gotham and put them away. Opting for Lex Luthor, the Joker or Catwoman will obviously have you fighting alongside the villains and trying to thwart the Justice League.

While it's free to play, you can buy a subscription, which will unlock more powers and other goodies. For more information check out the main DCUO site at, goo.gl/HF8NYA.

2) Wildstar

Wildstar has only recently turned to the free-to-play model, and it's fast become one of the most popular MMORPGs in recent times.

It's a graphically splendid game set on the planet Nexus, where you can choose from two opposing factions, The Exiles and The Dominion, to fight for the planet.

There are loads of races to choose from and six different classes each with a unique path that has custom content and a different style of play.

The combat system can take a bit of getting used to, but once you've wiped out a few enemies, you'll soon come to appreciate how advanced and easy it is to lock onto a target and finish them off.

Overall, a superb game and you can find out why at goo.gl/rgep31.

3) Skyforge

Skyforge is a very new (launched in July) MMORPG that puts you in the boots of an immortal defending the planet of Aelion against innumerable alien invasions.

You start your character as a low immortal, then by completing quests and missions you gain followers, whose belief in you raises your power. Eventually, you'll become a god and can take on the alien war machine single handed.

Graphically, *Skyforge* is excellent, but it also has some interesting gameplay elements, such as the ability to switch classes on the go, so you can level up multiple classes without having to create a new character every time.

It's certainly fun to play, and you can find out more at goo.gl/lg5JU9.

4) Age of Conan: Unchained

Age of Conan gets a lot of grief due to its clunky movement and combat system, but there's something we like about playing the role of a barbarian, sword wielding maniac that keeps us coming back to AoC for more.

Obviously based on the world and races created by the legendary Robert E Howard, AoC puts you in the Hyborian age, with a choice of characters selected through a complex and quite intensive character building process.

There are many unique elements to AoC, such as riding a mammoth into battle and being able to roam the lands of Hyboria freely. Of course, it's also one of the few mature rated MMORPGs, mainly due to the Conan adult content.

It's worth playing, though, despite that. For more info go to goo.gl/ApZcqR.

5) Star Wars: The Old Republic

SWTOR is another older MMORPG that has an equal amount of fans and haters, but we're quite keen on it and enjoy the fact that we can finally choose to become a Jedi, Sith, Bounty Hunter, Smuggler and other such classes.

You begin by choosing your alliance, Sith Empire or Galactic Republic, and from there you take on a vast number of missions to further your skills and watch as the story unfolds.

There has recently been some new content loaded, with *Knights of the Fallen Empire*, which is getting some very positive feedback from players.

It's certainly one of the better MMORPGs available at present, and if you're into Star Wars, then it's one you should really enjoy.

You can find out more at goo.gl/pqSBkp.

Conclusion

Although these are only five examples, there are hundreds of other MMORPGs available. Of course, there are some that really aren't worth the bandwidth downloading, but the vast majority are well developed and cleverly designed games that cover a wide range of tastes.

A good place to look for MMORPG content and to catch up with the latest news in the genre is MMOBomb, found at mmobomb.com. There are pages of reviews, new games, browser based games and even a forum where you can discuss or argue over which MMORPG is better.

For the time being, though, we're off, and we'll see you in the virtual worlds of our favourite MMORPGs. [mm](#)

Five More Worth Checking Out

Here are a handful more free-to-play games that you should definitely look out for:

Aion: one of the most popular MMORPGs going, with superb graphics and wicked gameplay.

Neverwinter: With *Neverwinter* you can build your own dungeons and fight some of the most impressive creatures ever to grace a monitor.

Allods Online: A highly polished MMORPG, where you can build Astral Ships and battle other players.

Fallen Earth: in a post-apocalyptic future, ravaged by nuclear and chemical warfare, you have to try to survive.

Star Trek Online: A once very popular MMORPG that somehow still manages to bring in new players, *STO* lets you take on the role of exploring strange new worlds, seeking out new life... and so on.



New And Trending Apps In The Windows Store

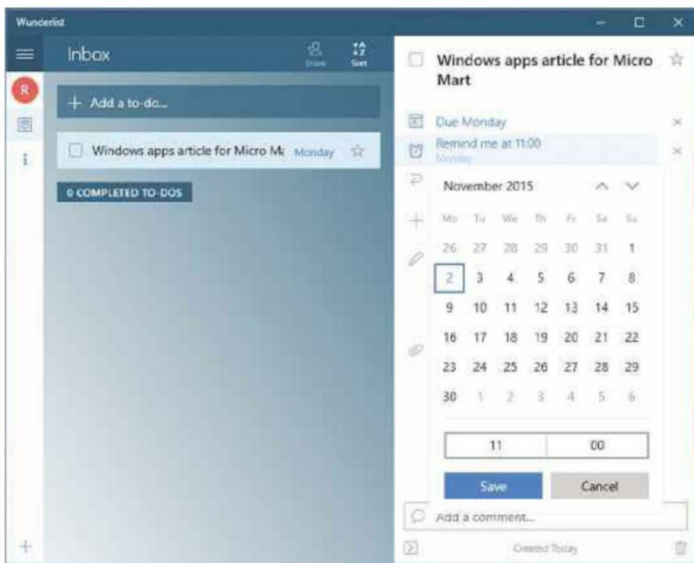
It's time to take a fresh look at Windows Store apps. Roland Waddilove looks at the latest additions, updates and hot apps

Windows 10 brought some major changes to the way that Windows works, one of the biggest of which is the return to the desktop and the abandonment of full-screen Metro/Modern UI apps. Apps from the Windows Store now run like regular software in a window on the desktop, and there are some fantastic ones available for free or really low prices.

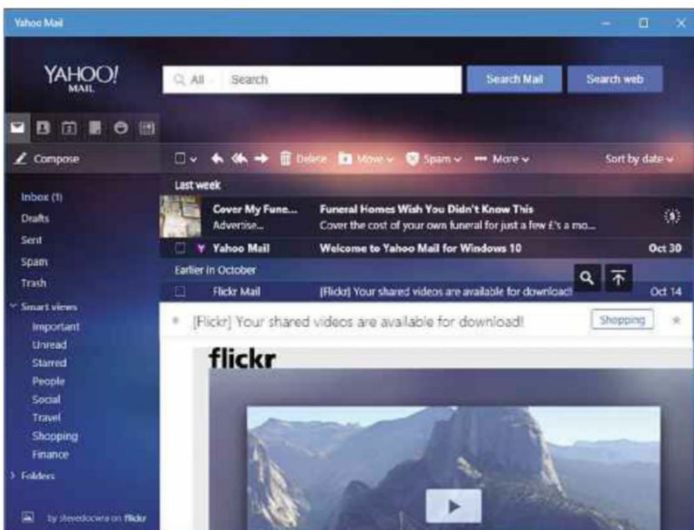
The Windows Store was limited when Windows 8 was launched, but in the years since, it has filled nicely, and now

there are thousands of apps to choose from. New apps are being released daily, and old ones are being refreshed and updated with new features.

If you were put off apps by Windows 8's clunky Start screen and awkward full-screen interface, it's time to take a fresh look at them. Here's just a small selection of what's available and most of these are either new or recently updated. Most of them are free too, although sometimes there are optional in-app purchases to add extra features if you want them.



▲ Wunderlist can be used on many levels from simple to-do list to corporate projects



▲ Yahoo Mail users can get all their email in a compact and feature-packed app

The easiest way to get these apps is to open the Store app and type the name into the search box. Click the app name, click the Free or Free Trial button, and they download and install.

Productivity

Wunderlist

6 Wunderkinder Gmbh, free. Score: 9/10

Wunderlist is a to-do list manager, and although there are many alternatives, what makes this one unique and worth getting is that Microsoft thought it was so good it bought the company. The deal went through last June, and now Wunderlist is a Microsoft product. Little has changed so far, but it's likely to be working more closely with other Microsoft products like Office in the future.

The app is available on Windows, Android and iOS, and your to-do lists are automatically kept in sync. It sounds simple enough, but the app does a lot more than manage to-do lists. A task can have a due date, a reminder date and repeat options. Files can be attached to a task, notes can be added and sub-tasks created. This makes it useful for complex tasks,

and if you want it to be, it's possible to use it like a simple project manager where you collect notes, files, complete sub-tasks and so on.

That's not all. Lists can be created to organise tasks by subject, work, personal, project or whatever you want. Tasks can then be added to these lists. This is not just an organisational feature, because you can invite other people to the list. You become the admin, and everyone else becomes members. Tasks can be assigned to members, comments can be added to tasks and so on.

Wunderlist can be used on many levels and is useful not only to home users with simple to-do lists, but also for companies with groups collaborating on projects. It is not surprising that it came to the attention of Microsoft, because it's a great app. Install it on your PC, phone and tablet, so you can access it everywhere.

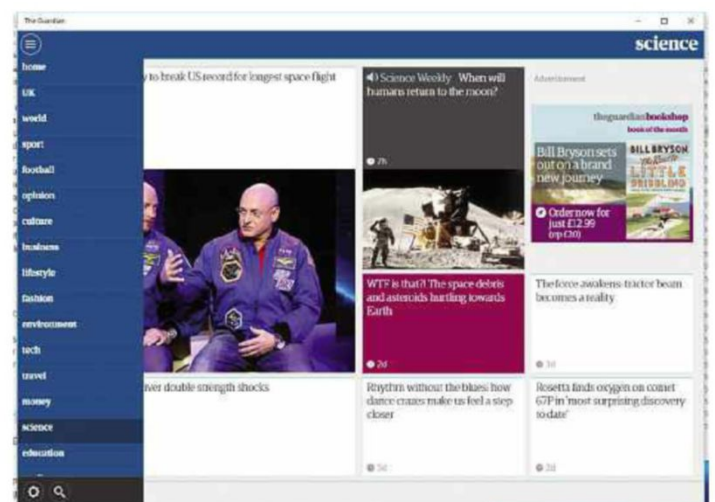
“ Yahoo Mail looks good, with many different graphical themes to choose from ”

Yahoo Mail

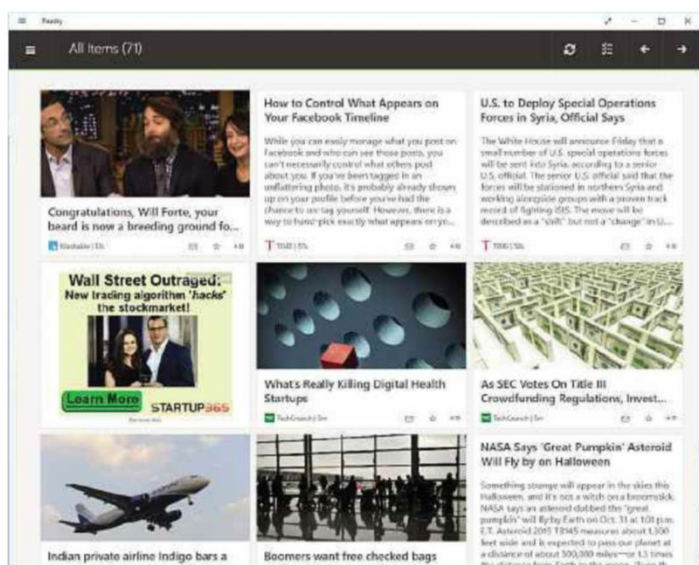
Yahoo Inc, free. Score: 8/10

The chances are that you have either a Google Mail, Microsoft Outlook.com or Yahoo Mail account. Some people have all three. If you have a Yahoo email account, and millions of people do, you might want to consider using the Yahoo Mail app. It's free and is an alternative to accessing your account in a browser or the Windows Mail app.

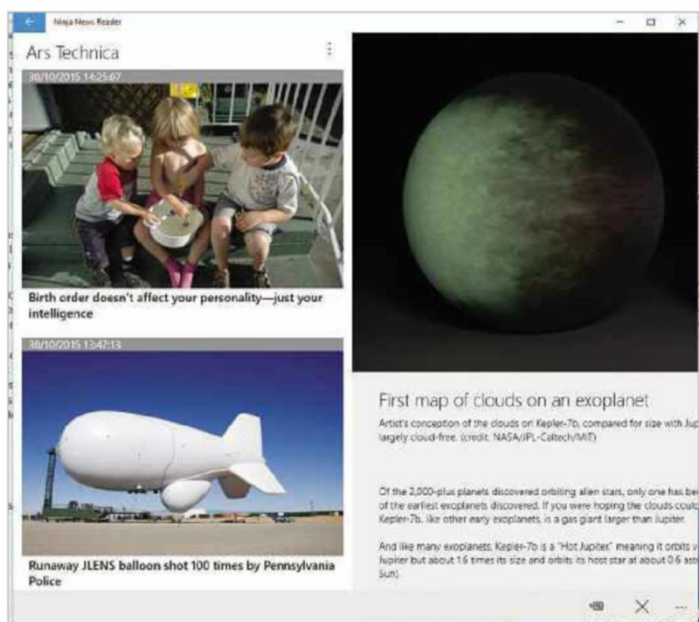
Yahoo Mail looks good, with many different graphical themes to choose from if you want to customise it. It has a collection of Smart Views that enable you to filter and sort messages in your inbox. These include important, unread, people, social, travel and others. Folders can be created and email messages moved to them to organise them. Yahoo is a search company, so there's a large search box at the top of the app window. This can be used to search your emails or the



▲ The Guardian is an excellent app that has all the latest news stories from the newspaper



▲ **Readiy** is an excellent app for displaying your **Feedly** RSS news feeds



▲ **Ninja News Reader** enables you to add your own news sources using **RSS** feeds

web. Yahoo Mail handles your calendar appointments and your contacts too.

The features of the app are tailored to the features of the Yahoo Mail service, which makes it better than Windows Mail, which has a strong bias towards Microsoft email, calendar and other services. Whether it's useful depends on which mail service is your primary one.

News

The Guardian

Guardian News and Media, free. **Score: 9/10**

The Guardian may not be the most read daily newspaper, but it is one of the better ones, and this app enables you to read the latest news stories and other articles for free. The UK, US, Australian or International edition can be selected to customise the content available in the app. In addition to this, there's a

menu that provides access to key subject areas including sport, tech, business, lifestyle, money, science and several more.

The home screen is made up of tiles, some of which contain just text headlines, while others contain photos. The content doesn't quite fit the tiles, which leaves white space, but it works okay, and it's easy to find interesting articles and click through to them. Articles usually start with a large, high-resolution image, and the text size can be adjusted. It looks good, with a lot of content each day. There's even a video

“ **Readiy** has an unusually large collection of configuration options ”

section with a variety of newsworthy clips, as well as a search facility that not only finds current news stories but also older ones from weeks or months ago.

The Guardian is an excellent app for viewing the newspaper's content. It's well designed and has great articles.

Readiy

Nishro Tech LLC, free. **Score: 9/10**

This is a different type of app: it's an RSS news reader. RSS news feeds have been part of the web for many years, and lots of people still rely on them to get their news. They're not as popular as they once were, but they are a great way to keep on top of changes and new posts to your favourite websites.

Readiy requires you to have a Feedly.com account and to configure your RSS news source on the site. Feedly is one of the most popular web-based RSS news feed services, and a lot of people have accounts there. Creating an account requires just a couple of mouse clicks and then you can browse Feedly's news sources and add them to your account.

Assuming you have a Feedly account, Readiy logs in and displays the latest news stories. It does it brilliantly, and the app has an excellent display. It shows a collection of tiles, each of which contains a news headline and either text or an image.



▲ **Panda Commander Air Combat** puts you in control of a fighter plane on a mission



▲ In *Hadron Wars* you build a base and an army, and then battle other players

Clicking a news item opens a larger preview, and clicking the headline opens the article within the app. This enables you to catch up on the latest articles and news stories from around the web without leaving the app.

Readiy has an unusually large collection of configuration options that enable you to customise how the app looks and works. For example, you can adjust the size of the news tiles, select from four interface themes, various options to mark items as read and so on. If you want a great app to view your Feedly news feeds, Readiy is recommended.

Ninja News Reader

Ardent Technology, free. Score: 7/10

Ninja News Reader is another RSS news reader, and it contains a small collection of news sources that are organised into categories. The News and Technology categories have the most feeds, and you can browse them and subscribe to the ones you like. You can also copy an RSS feed link on a web page and paste it into the app to add feeds, plus there's an import function that enable you to load a collection of feeds exported from another RSS news reader.

Some RSS feeds are rich in images, and they look fantastic in the app. You can browse the stories and read them within the app. However, some feeds are text only, with a headline, a couple of lines of text and a link that opens a web browser to read the article. In some ways, Ninja News Reader is excellent, but in other ways it's deadly dull. It is free, though.

Games Apps

Panda Commander Air Combat

Webelinx O.O.O, free. Score: 7/10

This is a vertically scrolling shoot-em'-up that is fast and furious fun if you like to blast everything that moves. You control what looks like a World War 2 fighter plane, although its weaponry is more futuristic than historic. The cursor keys control the plane, and you can fly left, right, up and down, but most of the time is spent near the bottom of the screen as the background scenery scrolls down and the enemy enters from the top.

Enemy gun batteries on the ground below fire at you, and you must avoid them or blow them up. Tanks on the ground fire at you too and can be avoided or destroyed.

Enemy aircraft fly in from the top and fire on you, and there are planes, helicopters and so on. A big boss plane appears every so often, which requires multiple hits to destroy while dodging its fire. In addition to all this, there are minefields floating in the air, heat-seeking missiles that follow you, flaming fireballs that come down the screen and more. It's hectic, breathless blasting.

The graphics are good, and there's a mixture of old and new technology. For example, your old plane can pick up power-ups like shields, and magnets that attract the stars that are left behind when the enemy is destroyed. This is a fun game that is fast and entertaining.

Hadron Wars

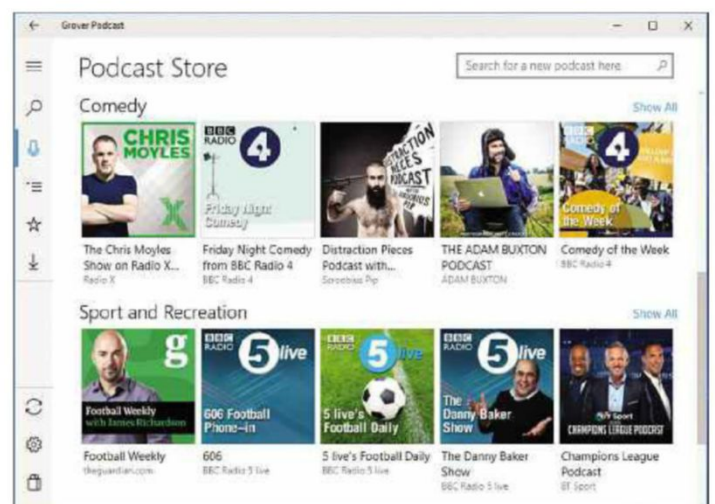
Necolt, free. Score: 8/10

This is a real-time strategy game that follows the usual format. As with other games in this genre, you are the commander of an army base, and there are three objectives. The first is to build up your base, the second is to train an army, and the third is to go and battle computer controlled players in the campaign missions or real people in the multiplayer arena.

You start off with a few basic buildings and a handful of soldiers. As you progress in the game, you can upgrade existing buildings to increase their capacity, output or speed of whatever they store or produce, and you can construct brand new buildings to enable new items to be built. Buildings and production are linked, so you need level X of one building to produce Y in another.

Constructing buildings, upgrading them, producing resources and training an army takes time, and as you progress through the levels, the time taken becomes longer and longer. At first, construction and production takes a couple of minutes, but later on it runs into hours. In-app-purchases enable you to buy speed-ups, which is a quick way to become a powerful player if you don't mind spending money, but if you're a patient player you can progress slowly but steadily.

This scenario has been created countless times before, but the graphics are different, the buildings and army units are slightly different, the gameplay has a few interesting quirks and, well, you just can't have too many RTS games. It's free and it's entertaining, so try it if you like this sort of thing.



▲ Find your favourite podcasts and subscribe to them with Grover Podcast



▲ Watch movies, films and TV shows for free on your computer

Tiny Troopers 2: Special Ops Game Troopers, free. Score: 9/10

You don't need to have played *Tiny Troopers* to enjoy this new version, but if you have you'll know what to expect. In this game you control a small group of soldiers and start out in a training camp learning how to shoot and protect yourself from the enemy. Training only takes a minute or two because the controls are fairly simple, such as clicking the ground to move your soldiers to that point, clicking on enemy soldiers to shoot at them, clicking and dragging grenades and bazookas to destroy enemy buildings and so on.

The aim is to progress through a series of missions that start off fairly easy but become harder with each one. You must kill enemy soldiers in one mission, destroy a radio tower in another and so on. Along the way are extra weapons and objects that can be picked up to help you achieve the target of the mission. You can call up airdrops of extra weapons and ammunition, pick up health packs and so on.

This game is more cartoon style than realistic, but the graphics are excellent, and the gameplay is addictive and great fun. Before each mission, you can choose your weapons and upgrade them, but to progress really quickly you need to buy upgrades in the usual way. A nice feature of games like this in the Windows store is that they work fine on old and limited hardware. You don't need a top-end PC to run them. Add it to your games collection.

Entertainment apps

Grover Podcast

Matheus Inacio, free. Score: 9/10

Podcasts apps are more common on mobile phones, because you carry the device in your pocket and can therefore listen anytime and anywhere, such as on the bus or train to work. If your PC is your home entertainment centre, though, you might want to install this podcast app on it.

It's a wonderfully simple and clean design that is a joy to use. It uses Apple's iTunes podcast directory and is a comprehensive collection of all the best podcasts available. The podcasts can be browsed by category, such as technology, sport, health, news and politics, and so on. All the podcasts have graphic tiles, you can subscribe with a click of your mouse, and you can get extra information. A search facility enables podcasts to be found by entering a keyword, so if you're interested in Manchester United podcasts, a search will turn up a list of them that can be subscribed to.

If you already use a podcast app elsewhere and can export your subscriptions as an OPML file, Grover Podcast can import them and you're all set up and ready to go. Your podcasts subscriptions can be browsed, and selecting one displays the episodes. Click one, and it immediately starts playing with no delay. There are options to download new podcasts, view unplayed podcasts, and add them to playlists.

“ TVCatchup turns your computer into an extra television, which can be useful if you have a family with kids and not enough TVs ”

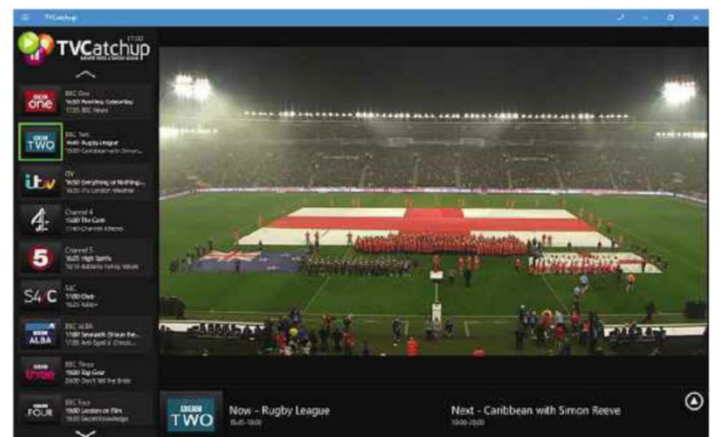
Movies Box, Films Box, TV Series Box Box Team, free. Score: 7/10

These three apps are from the same developer, and they provide access to free streaming movies, films and TV series on your PC. The app is surely of dubious legality, though, because it enables you to stream movies and TV shows that probably should not be available for free. Presumably Microsoft has some sort of approval process for apps that go into the Windows store and must have checked it, so it must be okay.

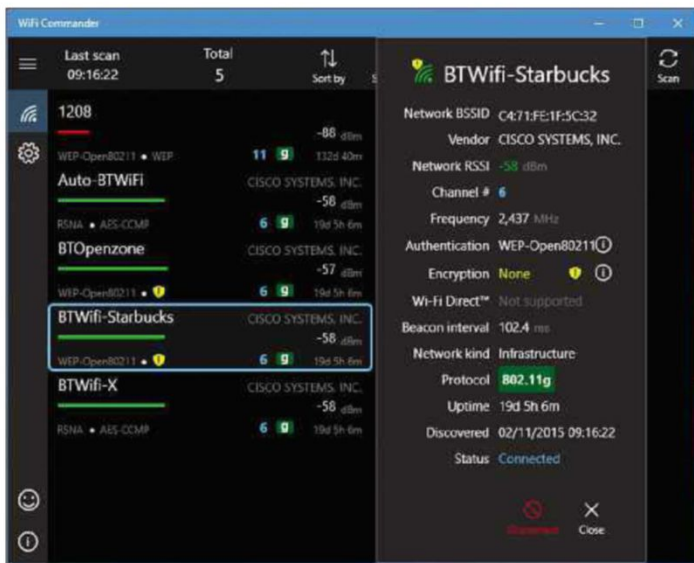
If you search sites like YouTube, Dailymotion, and popular file sharing sites you can find movies and TV series, and this is what the app does. It locates them and presents them in a simple but sometimes clunky interface that could really do with a makeover. There's a menu that enables the content to be filtered by genre, such as action, adventure, comedy, sci-fi and so on, which makes it easier to find the shows you're interested in.

The apps work well enough, and the movies and TV shows have thumbnail images, although they're a bit blurry. Click through to a movie and there's an attractively designed screen with options to play the movie or TV episode or watch the trailer if there is one.

There are some great movies and TV shows, and often the quality of the streaming content is good, with many items available in HD resolution. The apps are not in the same



▲ Watch free television channels on your computer with the TVCatchup app



▲ Scan the area for wi-fi networks and view the details with WiFi Commander

league as Netflix, though, and there isn't as much content. If Microsoft has passed this for inclusion in the Windows Store, then that's good enough for us.

TVCatchup

GZero, free. Score: 8/10

TVCatchup turns your computer into an extra television, which can be useful if you have a family with kids and not enough TVs for everyone to watch at the same time. Not everyone likes the same programmes, and sometimes everyone wants to watch a different channel. Now they can.

This app streams free digital television channels, which means you get BBC 1 to 4, ITV, Channel 5, Viva, BBC News, CBBC, CBeebies, Quest, QVC and several others. The quality, at least on computer-sized screens, is good, and the app is very easy to use. There's a channel list down the left-hand side and a list of the current TV show and what's coming up next. Clicking a channel switches to it, and clicking the show opens a TV guide panel that provides images and descriptions of shows coming up over the next 24 hours.

If only this app had a record facility, it would be brilliant. You can watch TV in a window on the desktop or full screen, and it's a great app that takes up only a couple megabytes of disk space.

Utilities

WiFi Commander

Forged Bytes, £1.75. Score: 8/10

Clicking the wi-fi icon on the right side of the taskbar shows a list of wireless networks within reach of your computer, but all it displays is the name. Most of the time this is all you need to know, since you just want to connect to a network and get online. Sometimes you need more information, such as when setting up a router and selecting which channel to use. It's best to avoid ones that your neighbours are using, because interference can degrade the quality of the connection. What channels are being used? How can you tell? When you're out with a laptop and want to use a wi-fi hotspot, there may be several to choose from, and you want the one with the best-quality signal. There's no way to tell, though.

This is where WiFi Commander comes in useful. It scans the networks within range of your computer, gets all the details

and displays them in a list. Click a network, and an information panel tells you everything you need to know about it. The app does little else apart from show the details of wireless networks, but its simplicity is its strength. It's a very useful tool that does exactly what you want, and it costs less than a Starbucks latte. A free trial is available.

Photo Editing

Polarr Photo Editor

Polarr Inc, £11.59. Score: 8/10

The Photos app bundled with Windows is okay, and it has some useful features, but Polarr Photo Editor is much more powerful and has many more features. There are many desktop applications for editing photos, but they tend to be either too simple and offer only basic features, or they're too expensive and complicated. Polarr Photo Editor is £11.59 (free trial available), so it's cheap enough that you aren't going to lose sleep over the cost.

The Metro/Modern UI interface is very different to a desktop photo editor and is heavily influenced by mobile app designs. There are few menus and almost everything is on a slider, button or chunky control that can be tapped with a finger as easily as it can be clicked with a mouse. In fact, it may be a bit easier to use if you have a touchscreen.

There's a collection of over 50 filters that are typical of mobile photo apps. A panel can be opened on the left with filter effect thumbnails, and you just browse and find the one you want and tap it to apply it. They include filters like warmth, icy, cinematic, charcoal, paper and more. A before and after side-by-side comparison shows the changes made to an image.

A panel on the right provides a comprehensive collection of tools that are organised into categories that can be expanded and collapsed. There are too many tools to list here, but to mention just a few, there's colour temperature, tint, vibrance and saturation. There's exposure, brightness and contrast, highlights, shadows, whites and blacks, diffuse and dehaze, grain, lens distortion and many more tools. Many of them are simple sliders, and the effect is immediately shown on the image, which makes it easy to experiment with adjustments. If you don't like the changes to an image, you can step back through all the actions applied to it in the history list. **mm**



▲ Polarr Photo Editor has a good range of photo enhancement tools and is easy to use

App Battle

Google Maps

Versus Citymapper

It's a bust-up between map apps as Rob Leane steps into the ring with Google Maps and Citymapper...

The age of the app has reached something of a critical mass. We're now at a stage where there isn't just one simple option for any of your technological needs. Instead, there are two or more incredibly similar apps competing for your affections in any given area. When we notice an occurrence of this phenomenon, it's time for an App Battle.

We've previously helped you pick the best live streaming app (Meerkat Versus Periscope, issue 1382) and tell the difference between files storage systems (Google Drive Versus Dropbox, issue 1386), and we've got a doozy for you this time. We'll be asking this big question: which is the best map app?

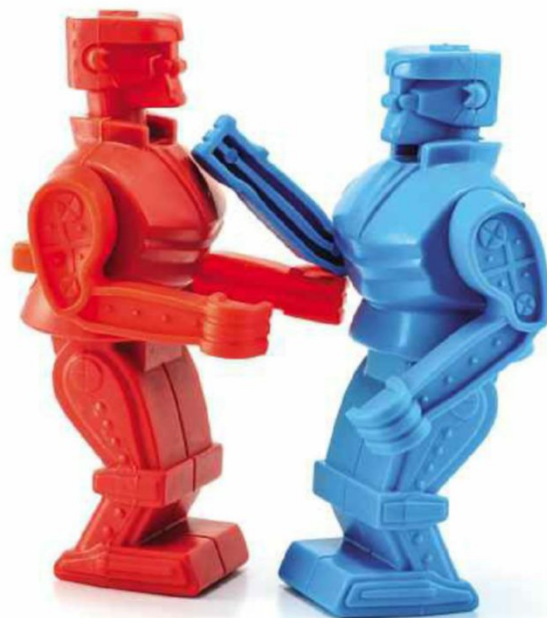
Although your phone probably comes with its own built-in map/directions app, the chances are that you've considered upgrading to a better one. Both Google Maps and Citymapper are popular free options. Within two days on the iOS App Store, Google Maps had been downloaded a whopping ten million times. Citymapper has rolled out a unique service in 29 international cities. Put simply, these are the big cheeses of apps that help you get around.

We put them to the test...

A To B

Google Maps has a bit of a head start in this App Battle, in all honesty. Even if you don't have the mobile app version, you'll be familiar with the Google Maps desktop website, which has been growing in scope and stature since 2005. The mobile version of Google Maps, as you'd expect, plays into the strengths of the original upscaled version.

The app doesn't take long to download, and it opens up pretty much instantaneously when you call on it. If this freelance writer decided to pop up to London and visit Micro Mart HQ, it tells me within seconds of searching exactly how long this journey would take me by car.



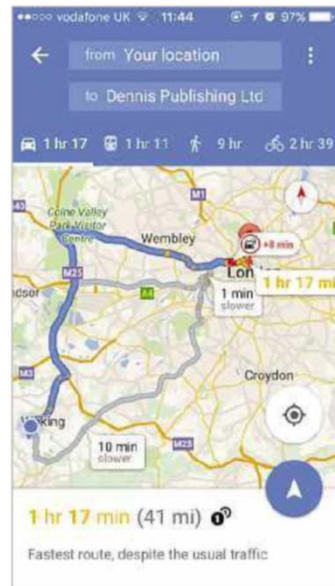
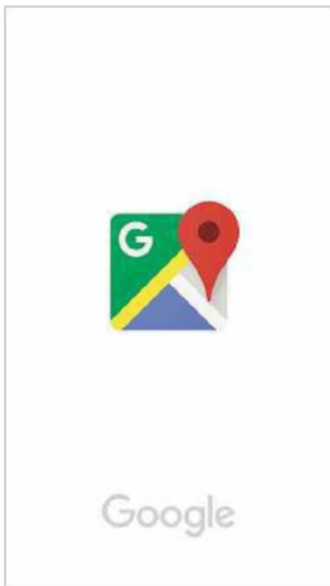
Once I click on the little image of a car, Google Maps will give me a detailed run-down of the best route and a nice big visualisation of the map. This route has tolls, I'm reminded, and the approximate delays that traffic will cause are estimated.

If I pick a different option from the bar towards the top of the page, I'm told that travelling by train would be a little quicker. A brisk cycle would add an hour and a bit to my journey, while opting to walk from Woking to Central London would apparently take nine hours (I probably won't try that). Yes, as you'd expect from a tech giant like Google, its Maps service makes the task of getting from A to B incredibly easy.

Citymapper, on the other hand, takes a different approach. After another easy download, and a slightly longer boot-



GOOGLE MAPS VS CITYMAPPER



Extra Features

So what else do these apps have? For starters, Google Maps has quite a lot of other ideas beyond basic directions and mapping. Once you start a search, for example, Google Maps immediately offers you a list of likely things you're after – supermarkets, petrol stations, cash points, chemists and many more sorts of service are allegedly only one thumb-print away.

Unfortunately, this quick options feature doesn't work quite as well as you'd like. I click on 'cashpoints' and then 'cashpoints near me,' and its best suggestion is in central London, 22 miles away from my current location. There's one down the road, Google, come on! After going back to the main map page and reminding Google where I am, it finds one 1.4 miles away. It's still not the closest cashpoint to me, though, which highlights how Google isn't quite as omniscient as you might think.

Google Maps also includes 'Google Earth' in its menu bar, but when you click on that it asks you to download a different app. You can click on 'Satellite,' though, and see real-life imagery of the map you're looking at. That can come in handy when you're out and about and not quite sure of your bearings. There's also 'Your Contributions,' which allows you to review restaurants, museums and the like to aid those searching around for something to do.

We listed a few of Citymapper's other spins on its mission statement in the previous section – it's very easy to set your Home or Work location and quickly find out the speediest route there at any given time. You can also save your favourite places (a feature shared by Google), and browse your recent journeys with ease. That's occasionally useful when you can't remember the name of a good place you ate last week and other such memory fails.

Citymapper also has an impressive social aspect to it: when you're on a journey you can click the 'Share ETA' button in the top-right corner, which then allows you to send a 'Follow my trip in real time' link to the hapless friend or loved one who's waiting for you dotingly at the other end. They can then access updates on where you've got to and how much longer you'll be. Very smart, indeed.

There's also an option, on the front page, to choose 'Meet Me Somewhere.' In this mode, you select your destination and send it to someone else, so they can get their own tailored instructions on how to get there. Again, for those who live in the city, this can prove to be a very handy hassle-reducer.

Winner: Citymapper's social uses win this round, proving a little more useful than satellite imagery in normal everyday life.

Overall winner: Both have their merits, but Google Maps is probably better for the majority. If you live in a major city, though, Citymapper is a must-have. [mm](#)

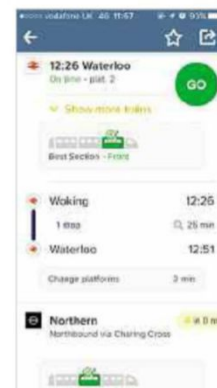
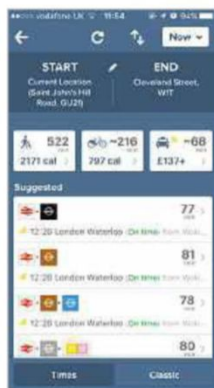
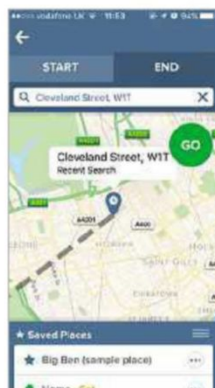
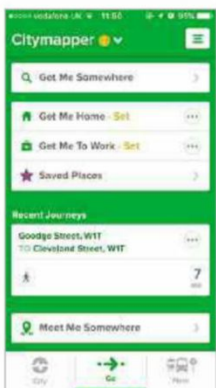
up time, you're given a list of options. These are 'Get Me Somewhere,' 'Get Me Home,' 'Get Me To Work,' 'Saved Places' and 'Recent Journeys,' and 'Meet Me Somewhere.' For purposes of comparing Citymapper's capabilities to Google Maps, I choose the simple option – 'Get Me Somewhere.'

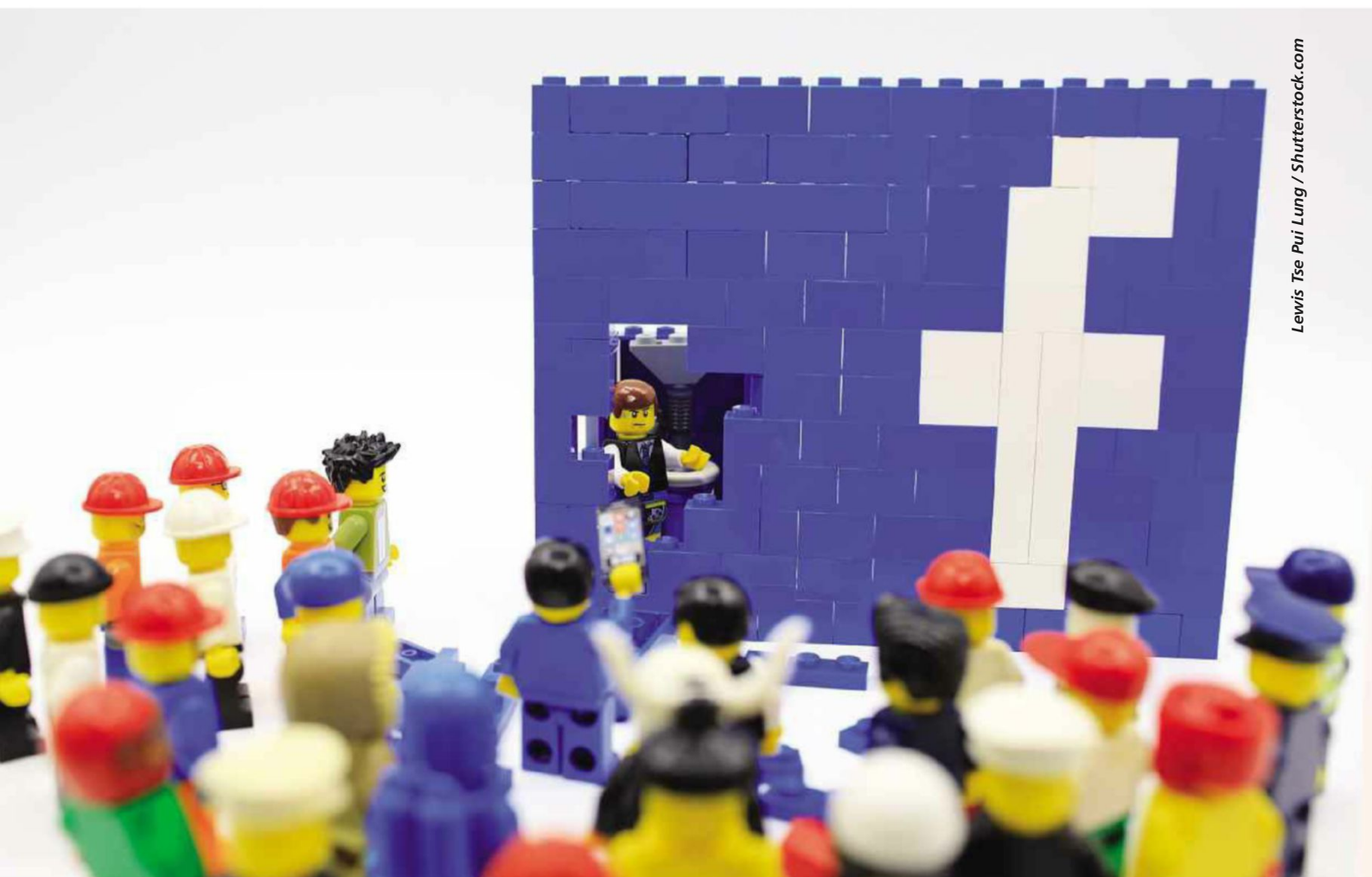
As I did with Google, I search for Micro Mart's base at Dennis Publishing's London headquarters. The immediate difference in the result is that Citymapper is geared towards commuters and city frequenters. I'm not immediately told about tolls or traffic. Instead, it's 'suggested' that I hop on a train and then a tube. I can choose driving, cycling or walking (522 minutes) options if I like, but I agree with their suggestion and click into the primary suggested train route.

I'm told immediately that the train from Woking to London leaves in half an hour, and that this leg of the journey will take 25 minutes. Impressively, I'm also told that the best section of this train – where I'm most likely to find a seat – is the front carriage. Genius!

Similarly to Google Maps, once I get as close as the trains can take me, Citymapper will continue to give me walking directions, with a little arrow moving about on the map screen to assist if I get confused (which I probably will, knowing me).

Winner: This section has to go to Google Maps. Although Citymapper is a London commuter's dream – and probably bests Google for user experience – it's utterly useless unless you're near one of the 29 supported cities. Google's global reach is more universally useful for getting around.





Lewis Tse Pui Lung / Shutterstock.com

How Secure Is Facebook?

Almost everyone with a PC or smartphone uses it, but how secure is Facebook, how safe is your data, and how can you protect yourself?

HOW SECURE IS FACEBOOK?



Facebook is synonymous with social networking and media, and it's the centre of many people's social lives, both online and off. It's seen off sites like MySpace and has become the undisputed king of online interactions. While services like Twitter allow you to share short thoughts, and Instagram provides tools for sharing your snaps, Facebook is your whole life, distilled into an ever updating news feed.

A simple five-minute check of your feed on Facebook can easily turn into a much longer session of browsing through endless memes, jokes, videos and, of course, updates from friends and family. It's addictive and can lead to productivity-destroying levels of procrastination. It's great.

As Facebook became more and more popular since its inception, and more users took up the service, more attention turned to social media in general. Online social networking became a rock solid part of every day life, and what started out as a simple news feed quickly evolved and turned into the unstoppable juggernaut we see today. Quizzes, surveys, groups, games and all sorts of other features were added, and with this came even more interest. The bigger Facebook grew, the bigger a target it became for those who see it as an advertising platform or a target to steal data and information. Add to that the quick, unstoppable growth of mobile devices like smartphones, which

Facebook is simply perfect for, and you've got quite the online collection of sensitive information – information that many people would like to have. There are ways to stay safer, though.

Hidden Threats

When you sign up for a Facebook account, you first create your own profile. This can contain your name, age, address, gender, profession, likes, dislikes, political stance and much more. It's a veritable cross-section of your whole life, and this information is very valuable to the right person. It's a marketer's dream having so much useful information in one place, and should this be obtained, by means either fair or foul, you'll quickly find yourself under fire from so much targeted advertising and mail bombs your spam filters could well melt down under the weight of it all.

Of course, the use of this information isn't always used in such a benign (if annoying) way. Some parties attempt to use this in very illegal and damaging ways. Identity theft, credit card fraud and other crimes have been known to occur from online data leaks, making this problem go from an irritation to something much more serious.

Does this mean Facebook is dangerous? Should you keep your kids off it and even delete yourself? No, that would be an overreaction. It is important, however, to know the dangers and how to safeguard against them.

◀ *Smartphones have made apps like Facebook hugely successful*

Controlled Information

Signing onto Facebook doesn't mean you have to supply all of your information, and it's important to remember this. Facebook doesn't actually require a lot of the data it asks for, and as many times as it may nag you if it considers your profile to be incomplete, you shouldn't feel pressured to give it everything it wants.

The only information you need to supply in order to create an account is your name, email address or phone number, a password, your birthday and your gender. That's all you need. Other information you can give, such as your address, interests and so on are all optional. This means, if you so wish, you can be far less revealing about yourself but still gain the benefit of using Facebook to connect with friends. This also has the added benefit of making it more difficult for Facebook and affiliated third parties to assault you with targeted ads. If the information isn't in your profile, all it can do is monitor your browsing habits. You'll still get such junk, but maybe less.

That's just a side effect, though. The real benefit here is your almost total secrecy. Facebook won't know your physical address, your job, where you went to school and other potential intrusive and private information, and that's key, as it's always good to be frugal with your personal details in a public space, especially if you're concerned about security online.

With Facebook, however, this is even more important, as there are so many ways for the social site and its various users to grab this information and use it. Even if you don't supply this information in your profile, there are other ways you can



▲ *Facebook is engrained deeply into modern culture*



▲ You don't need to tell Facebook your life story when setting up an account

be tricked, and it's here where many find Facebook to be at its most nefarious.

Stealthy Intrusion

We've all seen the endless stream of 'fun' quizzes and surveys posted on Facebook. You know the ones. 'Find out who secretly loves you.' 'Can we guess your taste in music?' 'What's your IQ?' The list goes on and on.

The majority of these are harmless enough, if inane, but some are a little more worrying, including ones that cannot be attempted without first providing access to your profile and/or friends list. As soon as this request is made for a simple online quiz, alarm bells should be sounding in your head.

It's perfectly understandable (if not desirable) for an app like a GPS or a communication tool to need to access your current location or list of friends for chat purposes, such as Facebook's own Messenger or Google Maps. Why, though, does a silly, time wasting quiz require such information?

▼ You can opt to see how others see your account, so you can ensure private info is just that

The simple answer is most of the time it doesn't. It simply wants the information. What is planned for this will vary. For the most part, it's probably harmless and is simply for use in the activity, but sometimes it can be unsavoury. We've seen examples of people providing such information, only to notice posts on their timelines afterwards, which they didn't actually type themselves. Coincidence? Maybe, but it's not unheard of for this kind of thing to happen. This is just the visible sign of a potential misuse of your information; the ones that you don't know about can be even worse.

For this reason, it's always best to abstain from such activities. If quizzes or

surveys like this ask for your information and you're not sure if they're trustworthy, just say no and scroll on. Even if such instances of problematic results are very rare, is it really worth the risk? No, not really, and it's best to err on the side of caution. Let's face it: most of these online quizzes are pointless and based on no real facts or science anyway. They can be fun, though, so it's your call.

Choose Your Coverage

Facebook is very aware of people's security needs and concerns, so over the years it's spent time implementing various security settings, and we'd advise you make full use of them. You can choose who can see your posts, who can send you friend requests (everyone or just friends of friends), and, more importantly, who can look you up via email and phone number. You can also opt to have other search engines link to your account (insta-tip: say no).

You have to include an email when signing up for Facebook, but phone numbers are optional. If you included one, we'd suggest you be careful in terms of who can see it. It's also wise to register for Facebook (and many other services) with a different email address to your main personal one. This avoids any potential junk mail being sent to your main email account.

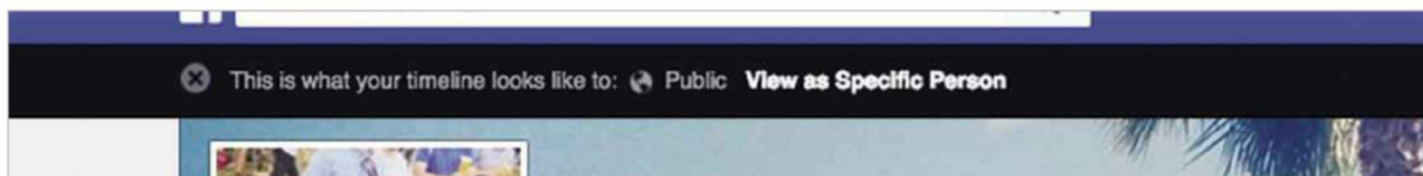
Another useful option is found within the security settings. You can choose to use a different password for apps, instead of using your main Facebook account password, which is the default. This is to avoid being locked out of apps if you forget your main Facebook password, but it's also a handy security option.

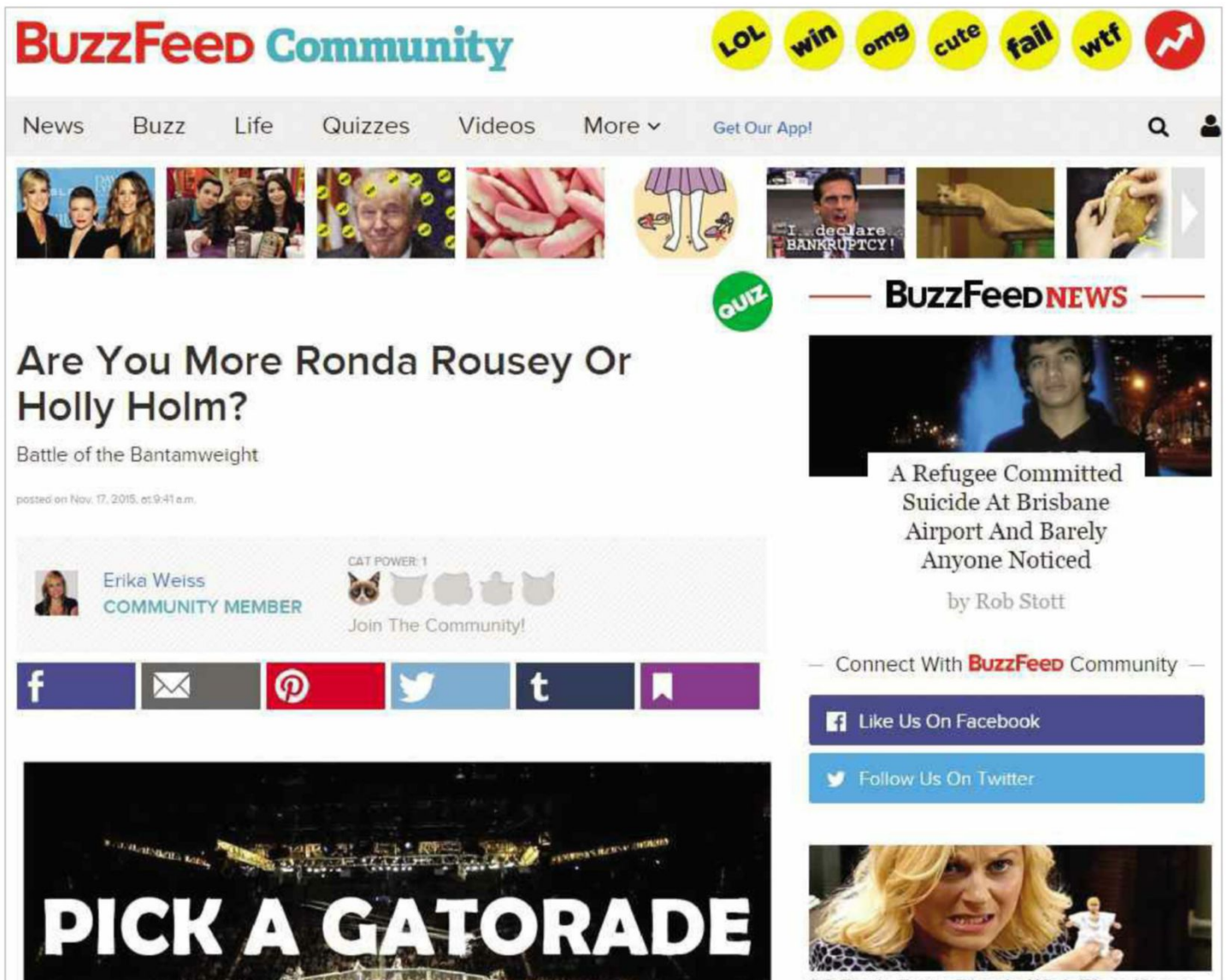
The security section also features useful additions, such as using security codes

Look In The Mirror

A very handy setting supplied by Facebook is the option to view yourself as others see you. This is very useful, as you can see exactly what other people see when they look at your profile. When you're trying to edit your settings to ensure certain information is private, this allows you to double-check, making sure you only share what you want to share with others.

You'll find this option by clicking the ellipsis button next to View Activity Log on your cover photo. Once you click it, your view will be switched to how everyone sees your profile. You can then reset back to you or view the profile as a specific person.





▲ Timeline quizzes are everywhere, and some require access to your account

and the ability to get alerts if there's a login on your account from a new device or browser. This can give you a heads up if someone logs in as you without you knowing. It's all helpful, and with so much of your personal information possibly sitting in your account details, it's all important.

It's Not A Competition

In the early days of social media, there was pressure to gain as many friends and followers as possible. People would gladly exclaim how many Facebook friends they had, and it was seen as a status symbol of sorts for the online generation. Some saw it as a competition or race to get the highest number possible.

Some aspects of this competitive nature remain, such as celebrities and companies who all wish to have as many followers as possible, for fairly obvious reasons, but for

Lock Your Phone

You'd be amazed at how many people don't use PIN or password protection on their mobile phones, even people who think nothing of leaving their phones on a table when they nip to the toilet in a busy café or bar. As Facebook is one of the single most used applications on mobile devices, it's not hard or unheard of for someone to get hold of a phone and rifle through information. At the very least, you could have jokes played on you (we've all got that one friend).

To prevent this, always use security on your phone, and as an added measure, don't use Facebook via your phone's browser and use the app, with the option of auto-login disabled. This isn't a measure most will like, as it's just pain inconvenient having to log in each time, but if you're very security conscious or this has happened to you before, it may be the better option for peace of mind.

the average user, it's no longer that much of a concern. How many friends you have just isn't important; it's who you have in your list that's crucial. What's the point of adding friends left right and centre if you'll never speak to the majority of them? Do you even know these people, and are

they people you want seeing your personal posts and photos?

It's far better to limit your Facebook friends to people you actually know. This way you can be sure no one is going to be untrustworthy, and you'll feel more comfortable sharing your thoughts and

▲ Facebook's privacy options should be checked

pictures. After all, unless you're a hugely confident, trusting and very open person, you wouldn't simply walk into a bar and shout out details about your personal life to a crowd of random people, would you? Why do the same online?

Censorship

A feature of Facebook is the ability to 'tag' people in photos and posts. Doing this puts a post on that person's timeline, which can be seen by anyone. This is normally perfectly fine, as it'll usually be friends and family posting. However, occasionally you might see a post on your timeline you wish wasn't there, for whatever reason. It can also be a security risk, as we mentioned earlier about potential posts from unknown parties. We'd recommend you enable tag reviewing. This will notify you of any posts you're tagged in and won't post them on your timeline unless you allow it.

You'll find this option in your account settings under Timeline and Tagging. You can also review individual tags added to other posts before they're made public, so this function extends beyond your own account and timeline and lets you control your presence elsewhere.

For those worried about offending friends and family by setting this option to active, don't be. Remember, anyone's account can be hijacked, as has been evident in the past, so posts from your loved ones may not even be legitimate and could be someone else. Again, this is going to be unlikely, but it does happen. You're simply being cautious, and if you're concerned about Facebook security, it's

something to look into. Friends and family should understand this.

The Obvious

Facebook is a very public and social site where people share their thoughts, opinions, gossip and much more with everyone else. Some people will post each and every thought that goes through their minds, while others like to share funny videos or jokes.

The most basic and straightforward way to stay safe when using it is to think about what you're posting and second guess yourself. There were many tales back in the days of MySpace with people typing out totally public posts of where they were and what they were doing, including young girls at bars and people going on holiday. The same happens on Facebook.

It doesn't take a genius to realise that announcing to the world that you're going to be away for a while and that your home will be empty is a bad idea. Likewise,

young girls announcing that they're going to be drinking, along with where, on a public forum is something that could lead to very serious consequences. It's no joke.

Also, Facebook has an age limit of 13 for a reason, and it's one of the main reasons setting up an account requires a birth date. As with many aspects of the internet, much if it isn't for kids. It's why parental controls are available. Facebook is no different, so you have to be 13 to use it.

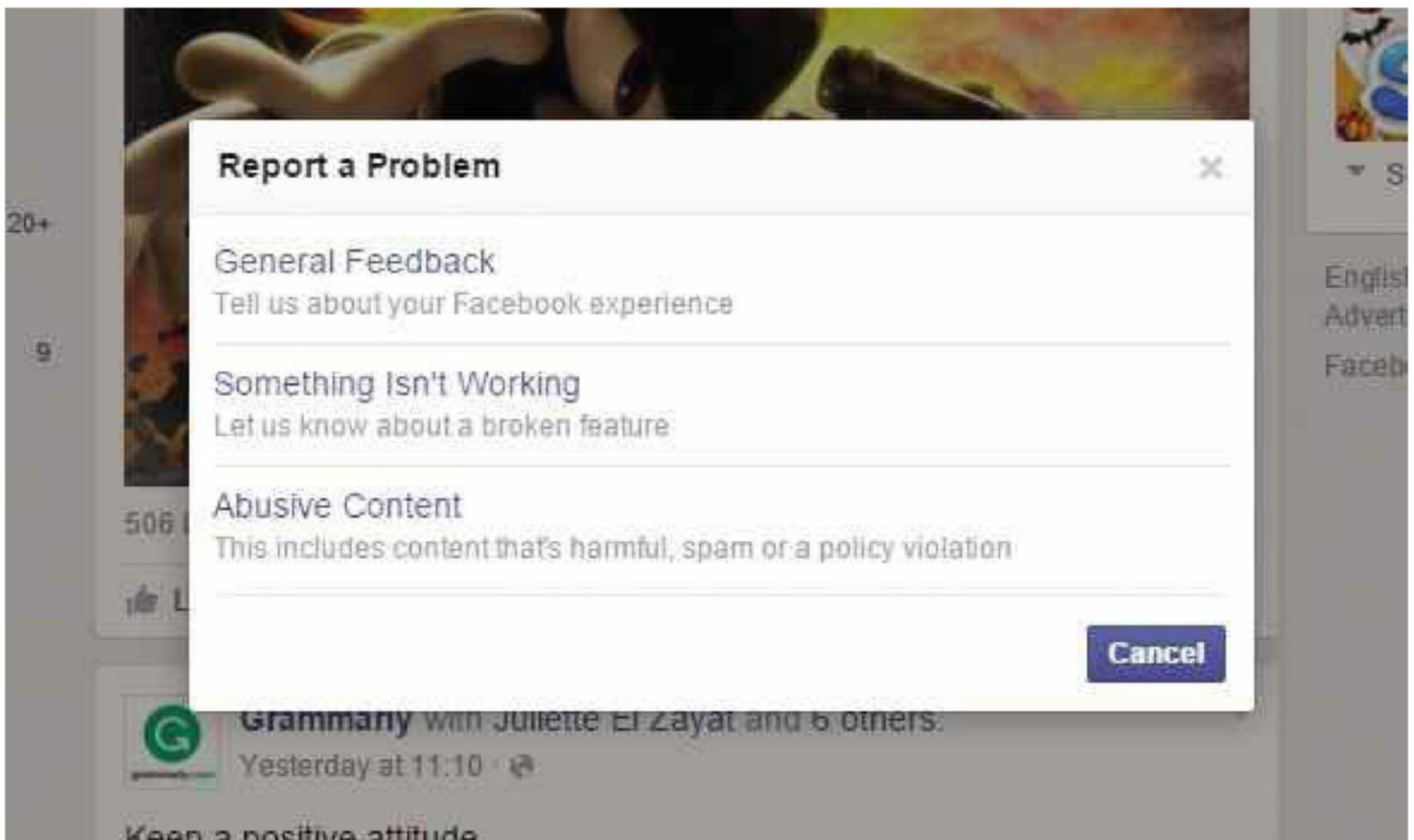
Of course, Facebook can't check each and every person's real birth records, and birth dates are easily faked, with kids entering false dates to appear older. It's here where parental control comes in, and children have to be monitored and educated. It's easy to give in when your kids are unhappy and saying all their friends have it, but it's important.

Lastly, never share your password. It's the number one security tip for any secure system, and it applies just as much to Facebook. Don't give out your login

Don't Bite

If you've used a computer for any length of time you'll probably be aware of phishing or the act of trying to fool people into divulging sensitive information with fake emails. Facebook users have also been targeted in this way, with emails supposedly from Facebook asking users to provide their usernames and passwords.

Facebook, like many other online services such as banking, will never ask for this, so don't be fooled. Never supply your details to anyone, especially random emails, even if they look legitimate. If in doubt, always contact Facebook (or any other organisation that's apparently requesting information) directly, using its own website. Never reply to emails like this or use contact information from them.



▲ You can report suspicious or unsavoury content and abuse to Facebook in many ways

details to people you don't trust (or to be perfectly secure, not even then). Also, be careful when logging into your account on a public terminal, such as a computer in a library. If you don't log out correctly, someone could easily jump in and post as you (it has happened). Always be sure to make your password is strong and not too easy to guess. Some users even routinely change their passwords every few months.

Most public computer terminal software will automatically log you out and clear down any personal information, but it pays to double-check.

Is Facebook Safe?

We've looked at some simple ways to stay safe on Facebook, but the big question remains. Is Facebook safe or is it a risk? Yes, Facebook is safe and, yes, it can also be a risk, just like any online service. Many security problems often lie outside of a service and with external problems or user error. Using Facebook on an insecure network, for example, or if you have some sort of malware can open up a huge problems with the site, but this same problem would exist for any usually secure site you visit.

Facebook as an organisation takes security very seriously, and although there

Tell Tales

In the playground and within criminal organisations so-called 'tell tales' or 'rats' are seen as a bad thing, but it's often the best way to help yourself and others, especially when it comes to potential problems with social networking or other online problems.

If you're affected by a problem or you see anything suspect when you're on Facebook, always report it. Facebook contains plenty of links and options to do this, such as selecting image options, where you'll find a report option, and the ability to report a whole account or person. There's also an option under the Report a Problem section where you can inform Facebook of any abusive content.

These are all important, and if you know of any such problems, don't feel bad for reporting it. No one will know, as reports are kept secret, and even if there's a misunderstanding and you report something that isn't actually a problem, you won't be in trouble.

It goes without saying, of course, that you shouldn't abuse this feature, and don't use it to cause problems for people.

have been problems, with more likely to follow, it's no less secure than many other sites people don't think twice about.

The real problem is Facebook's overbearing social weight. These days everyone is expected to have a Facebook account, and people think nothing of gladly typing in any and all information into it. This brazen focus on sharing each and every part of your life with others means the site is always going to be a risk and a prime target for those looking for such information. Information is power, as

the saying goes, and for advertisers and marketers, this is very, very true.

At the end of the day, if you use Facebook responsibly and consider your own security, it's not a problem, and you can use the service with no problems. It just takes some thought and a little self-control when it comes to sharing information. Keep a careful eye on services and apps that ask for access to your account details, and be sure to thoroughly check such services or apps before you agree. [mm](#)



Wikipedia Introduces Automatic Editing Tool

Zuckerberg's Philanthropy Questioned

We despair at times, we really do

Imagine, for a moment, that you are Mark Zuckerberg. You're a highly-successful, self-motivated billionaire who has recently given birth to your first child. Following her arrival, you announce via Facebook that you're going to donate \$45bn over the course of your lifetime to charitable causes by giving away 99% of the shares you have in your social media company.

The media world takes notice and praises you for your philanthropy. You're happy, they're happy. Everyone's happy.

Then, sections of the media dig into your claim a little bit and discover that the donations are actually going to go to an initiative called the Chan Zuckerberg Initiative LLC, an investment firm that will

plan to make more money with the funds that you are putting into it. With that money, the aim is to "engage directly with the people we serve" and to "advance human potential and promote equality". Some sections of the media turn on you and call you out for being disingenuous with your claims. This isn't charity at all. This, so go the claims, is just a way to move some of your money and make it tax free.

Wouldn't you be angry at the nerve of those media reports? What on earth does it have to do with them what you do with your money? To his credit, Mark Zuckerberg simply responded (on Facebook, naturally) by stating that he and his wife will indeed pay capital gains taxes when their shares are sold. Give the guy a break.



Low-quality edits handled by software

The bods over at Wikipedia are obviously a busy bunch so it's entirely obvious why the business would introduce a piece of software to help its editors out.

The Objective Revision Evaluation Service software – bit of a mouthful, that – gives editors, in Wikipedia's own words, X-ray specs, allowing them to better recognise how good (or not) an edit is. The artificial intelligence tool works by looking at the language and context of an edit and then automatically highlights those edits,

telling editors whether it deems them to be damaging or harmful to the context of the entry.

The Wikimedia Foundation wrote a blog post on the matter noting that the wealth of edits required every day – around half a million, in fact – means that this new tool will be vital in allowing them to separate relatively simple edits from the more serious ones requiring greater scrutiny. As this software isn't checking on the facts, *per se*, rather focusing on the quality of the edits themselves, it's a relatively straightforward introduction for the Wikipedia team.



With the end of the year closing in on us, what better time to start thinking about computer security? Okay, maybe any other time at all – when you're not preoccupied with shopping for gifts, decorating trees and thawing turkeys.

Maybe, though, at some time between Christmas dinner and your post-food snooze on the sofa in front of the TV, you might consider how you're going to stay secure in 2016.

Thinking about posting some festive photos on Facebook? Now might be the time to think about who's going to see them. And if you've just unwrapped a brand new tablet, it wouldn't hurt to spare a thought for how you're going to keep it secure. After all, even mobile operating systems are now vulnerable to malware.

Perhaps it's also time for a few technology-related New Year's resolutions? You could start by making sure all your computers, smartphones and tablets have security software installed on them, and maybe check that your router's firewall is on while you're at it.

Whatever you do, enjoy your Christmas, and we'll see you back here in two weeks' time.

Anthony

Editor

Game Awards Announce Winners

Controversy surrounding Konami

As the end of 2015 draws near, America played host to only the second annual Game Awards. The Game Awards are particularly interesting as they typically also include trailers of upcoming, major titles – and this year was no exception as the likes of *Uncharted 4* and *Far Cry Primal* were previewed.

It's also, of course, a chance to celebrate the greatest titles of the year and *The Witcher 3: Wild Hunt* turned out as the year's biggest winner, grabbing the Game of the Year gong. Likewise, Best Developer went to CD Projekt Red for its work on the game, while the Best Independent Game award went to the brilliant *Rocket League*.

Konami's *Metal Gear Solid V: The Phantom Pain* got the Best Action/Adventure title, but that wasn't the only thing notable about Konami's involvement. The developer behind the game, Hideo Kojima, was invited but didn't attend – because Konami's lawyers didn't want him to.

This is a follow-on from other recent events, including his name being taken off the game's packaging. Whatever is going on at Konami, its decision on this has been roundly jumped on by other developers, and attendees at the event were pretty vocal in their ire at the move, too.



Meanwhile... On The Internet...

It's been a good while since we've mentioned the name Satoshi Nakamoto in these pages. That is the (presumably false) name used by the creator (or creators) of Bitcoin in various communiques over the years, though beyond that little is known about who he/she/they really is/are. Indeed, the hunt has been on for the identity of Nakamoto for a while now; you may remember *Newsweek's* ill-advised attempt to pin the development of the controversial crypto-currency on a Californian going by the name of Dorian (née Satoshi) Nakamoto back in 2014. That ended in embarrassment for the magazine and a uncomfortable time in the spotlight for the unassuming victim of the investigation, which many criticised heavily for amounting to little more than a spiteful doxing, bereft of compelling evidence to back up its claims.

Therefore it must have been with great trepidation that *Wired* hit the publish button on its claims that the central figure in the whole Nakamoto saga was in fact an Australian businessman by the name of Craig Steven Wright (tinyurl.com/MMnet93a). Within the hour, however, *Gizmodo* had done exactly the same thing (tinyurl.com/MMnet93b), identifying the same little-known name as being the man behind it all.

Both had been made privy to a stash of documents, personal correspondence and transcripts that they assert amounts to Wright confessing to being behind Bitcoin. Allegedly provided to them by a former associate of the entrepreneur, if genuine, the evidence does appear to add up to *de facto* proof that Wright – likely with the help of the late American computer forensics expert Dave Kleiman – is indeed the mysterious Nakamoto. No one's really confirming anything but, as *Wired* puts it, "Either Wright invented Bitcoin, or he's a brilliant hoaxer who very badly wants us to believe he did."

Others do not see it as being clear cut, however (tinyurl.com/MMnet93c). At least one other reporter, the *New York Times'* Nathaniel Popper, has claimed to have been approached with the same information, but chose not to pursue the story as he "didn't find it convincing at the time" (tinyurl.com/MMnet93d). The reason he gives are the differences in the writing style of Nakamoto's emails and other matter proven to be by Wright; though he admits that *Gizmodo's* reporters found more interesting things out than he managed to (and applauds both publications' decision to leave the hoax option open), he says that "where I get stuck is the personality" (tinyurl.com/MMnet93e).

Whether or not Wright, or Wright and Kleiman, are the people behind Bitcoin, both are surely going to have their lives delved into over the next few weeks. Indeed, *The Guardian* reported that Wright's address in Sydney had been raided by police on the same day as the revelations (tinyurl.com/MMnet93f). Apparently, though, that was at the behest of the Australian Tax Office (potentially interested in the haul of Bitcoin under the control of Nakamoto), rather than in direct response to the breaking stories.

While we're throwing around names we haven't featured for a while, let's turn our attention to Anita Sarkeesian, a target for some of the worst – and most high-profile – abuse that was dished out during the Gamergate affair. Not that she wasn't a target before, and since, simply for being a woman with an opinion that not everyone agreed with. Sadly, in the world of social media, that's pretty much all it takes to find yourself a target of hateful diatribes, intimidation and physical threats of the worst kind.

It's little surprise, then, that she has decided to contribute to and host a new initiative called *Speak Up And Stay Safe(r)* (tinyurl.com/MMnet93g) as part of her wider Feminist Frequency website, which offers up advice and strategies for fending off online attacks. The site introduces itself as being "for anyone who fears they might be targeted, or who is already under attack, for speaking their mind online, but is especially designed for women, people of color, trans and genderqueer people, and everyone else whose existing oppressions are made worse by digital violence."

It begins with simple steps to "keep yourself safe from individuals, loosely organized groups & cybermobs online", and moves on to tips for policing social media, making online gaming safer, dealing with physical mail and advice on documenting incidents of abuse among other things. It's all practical, useful, horrific stuff that no person should have to be reading about, but which is sadly indicative of our times.

Without doubt, our favourite new subreddit of the week is *r/donaldandhobbes* (tinyurl.com/MMnet93h), which replaces half of Bill Watterson's legendary comic strip duo with Donald Trump. Amazingly, the rantings of the oft-petulant, generally id-driven six-year-old are surprisingly suited to the potential Potus. Which is beyond scary, frankly.

However, as is becoming increasingly obvious, Trump is pretty much beyond parody and seemingly intent on putting satirical comedians out of a job. To wit: his comments on wanting to get in touch with Bill Gates to discuss "closing that internet"... No, really (tinyurl.com/MMnet93i). Sigh.

Let's dive deeper into the file named 'Well, you couldn't make it up' with news that researchers have found vulnerabilities in three of the major security suites. Specifically, Kaspersky, McAfee, and AVG (tinyurl.com/MMnet93j) are all being pointed out as vulnerable by a team from security firm EnSilo, which believes that the problem – which it originally found in the Free AVG software back in March – may be found in other similar software beyond those it has already named. Indeed, it has produced a tool to allow you to check for yourself (tinyurl.com/MMnet93k). Long story short: update now!

.AVWhy?

Videos For Your Eyes...
Not Necessarily For Your Brain

If you haven't seen this yet, then treat yourself to a viewing of Volvo's attempt to top the brilliance of its Jean-Claude Van Damme 'splits' advert. While the footage of a four-year-old child driving a massive dumptruck by remote control, with destructive consequences, isn't quite as meme-friendly as the flexible Belgian, it is has just enough of the *Top Gear* about it to be arguably more entertaining. Whatever, it's conclusive proof that sometimes dreams come true (tinyurl.com/MMnet93l).



Caption Competition



"It seems that Roger misunderstood when they said 'put your money where your mouth is'"

This ol' moneybags was the subject of our Caption Competition in issue 1391; here are our favourites:

- **JayCeeDee:** "The day Texas Instruments was enrolled onto the London Stock Market."
- **Dwynnehugh:** "How software companies see us?"
- **Dwynnehugh:** "Money talks."
- **doctoryorkie:** "Maths for the esoteric. You have three bags of money and your teeth hurt. Show your working out."
- **doctoryorkie:** "How to guarantee a capitalist won't open their mouth."
- **wyliecoyoteuk:** "How your dentist sees you."
- **Dwynnehugh:** "As your Member of Parliament, I totally deny the accusation of 'pigs and troughs'."
- **pesukarhu:** "Only today : Save 10% when buying 3 bags of DentoFix glue!"
- **BullStuff:** "I went to Walmart for a calculator, and Texas Instruments gave me cashback!"
- **BullStuff:** "Call ResykelUrCalc.com NOW and get cash for that old calculator!"
- **pesukarhu:** "Meet my best paypal!"
- **ricedg:** "Inventor of the tide powered calculator puts his money where his mouth is."
- **Think Tank:** "This is the result when you do not use Windows calculator."

Thanks to everyone who entered, but the best of the week was wyliecoyoteuk with "It seems that Roger misunderstood when they said 'put your money where your mouth is.'"

To enter this week, come up with something to accompany the picture below, head to the 'Other Stuff' section of our forum (forum.micromart.co.uk), or email us your funnies via caption@micromart.co.uk, remembering to add the issue number to the email subject line. Bottom's up!



Apple Turns Teacher For A Week

Temporary classrooms in global stores

Coding has steadily become one of the year's tech buzzwords. The BBC's *Make It Digital* initiative has been championing coding throughout 2015 and with the latest Raspberry Pi now out in the field, everyone has the opportunity to code for a cut price. With coding making a mainstream comeback, trust Apple to be ready to grab a slice of the action.

This month, the company used every one of its global network of 468 stores to provide a teaching base for the Hour of

Code initiative. On December 10th, people were invited to visit a local store for an entirely free introduction to the basics of computer programming, while during a week early in the month, stores held workshops and various events aimed at kids aged six-plus.

The Hour of Code initiative is a lovely thing, running in over 180 countries and estimated by the people behind it to reach tens of millions of students. This year, *Minecraft*, *Star Wars* and *Frozen* games were all designed to bring coding to a younger audience and we applaud all involved..



Samsung Pays Apple Lots Of Money

It's the patent dispute that just keeps on giving

We've lost count of the number of words we've written on patent disputes between Samsung and Apple. It's not, let's be frank, the most thrilling basis for a story, despite being an absolutely crucial matter for both companies. As well as very expensive.

The latest instalment in the saga has seen Samsung agree to pay Apple \$548m in damages

over claims that it used some of Apple's patented technology without having Apple's permission to do so. Part of a much bigger \$1bn settlement first agreed back in 2012 (with the eventual fee lowered on appeal), this could be met with a further \$382m payment should Samsung be found by a jury to be guilty of copying Apple's packaging. That will be decided on next year.

Snippets!

4G Auction Delays

Industry regulator Ofcom has announced that it's delaying its auction of a slice of the 4G spectrum following letters from the parent companies of O2 and Three concerned with any decision being made until the ruling of the proposed merger between the two.

It's an understandable decision, as it remains to be seen what the European Commission will ultimately decide on any such merger. The decision on that is due out some time in May 2016.

V-Tech Not Secure

In other security news, experts looking at the V-Tech hack case have established that a database of customers' password information wasn't secure. A bod from Trend Micro was quoted by the BBC as saying that the company hadn't scrambled passwords and that answers to security questions were stored in plain text.

The problem for V-Tech, if this is the case, is that such a revelation will only lead to further recriminations and much wagging of fingers.

2% Use Windows Phone

According to global market intelligence firm IDC, Windows Phone will account for just 2.2% of the mobile market share in 2015 – and, even worse for the business plan of Satya Nadella – this is going to remain the case for the next few years. Indeed, IDC predicts that the share will rise to just 2.3% by the time we get to 2019.

Explaining its views, the firm noted that: "Despite all the effort Microsoft has put into the launch of Windows 10, IDC does not expect Microsoft's share of the smartphone OS market to grow much over the coming years". Ouch. That's got to hurt. Really hurt.

Facebook Introduces Live Video Streaming

For US users only. Boo

Back to Facebook we go now to bring you news of the service's introduction of live video streaming for mobile users. Initially for US users only, and only a "small percentage of users" at that, the launch follows video streaming's rollout for celebrities using Facebook earlier this year.

The service will also be limited to iPhone App users for the time-being, as was confirmed in a blog post on the service. As to how it works, the same posts says that Live Video helps "you show the people you care about what you're seeing in real time" and users will be able to share video by simply tapping on the Update Status button, writing a quick description of the video to accompany it.

During the broadcast, users can see the number of live viewers and a real-time stream of comments – which could be a dreadful thing, truth be told. Presumably, should this prove a success, expect this to gain a wider, global launch in time.



Pub Hack Bags Personal Data

JD Wetherspoon customers affected

You've probably frequented one of JD Wetherspoon's many establishments at some point in your life. Hopefully, though, you aren't affected by a data breach at the pub chain that has seen the personal data of over 650,000 customers let loose, thanks to a hack on its old website.

The affected database on the website concerned held details of names, email addresses, dates of birth and phone numbers. Customers that were affected were sent an email detailing that "very limited credit/debit card information" was also stolen from a "tiny

number of customers" who purchased vouchers for the chain online before August 2014. The email stated that just 100 customers were affected on this front as well as noting that as the database didn't contain the security number or any numbers beyond the last four digits.

While the personal data breach does suggest that the database wasn't secure, it also doesn't sound as though anyone should be overtly worried about this. The chain admits that with this information alone, nothing can be used for fraudulent purposes.

Overclockers Teams With GAME

PC components and full builds in store

Overclockers have announced a partnership with the GAME Group to sell PC components and fully-built PCs in some of its retail stores around the country. The announcement should, we hope, benefit both parties as it opens up the PC brigade for GAME while also giving Overclockers a high street presence.

Old and wanted hardware can be traded in towards brand spanking new PC hardware, and next year will see the Overclockers website (www.overclockers.co.uk) launch GAME's PC digital content range for sale – with a range of over 3,000 products. For now, anyone interested in seeing what GAME is stocking should head to GAME.co.uk/pcgaming.

IBM Accused Of Sexism

Social media campaign proves epic fail

IBM has ditched its #HackAHairdryer social media campaign, which seems quite the sensible thing to do. The intention of the campaign, launched earlier this year – although you'd be forgiven for having missed it entirely – was to highlight women's role in technology and encourage women to sign up to the industry.

Unfortunately for IBM, and whoever dreamt up that mildly offensive hashtag in

the first place, it backfired. Funny that.

Many took to Twitter to mock the campaign, noting that women are are occupy pretty high-pressure technology positions, thank you very much. The backlash was swift and IBM obviously had to react. As such, the company has reportedly admitted that the campaign "missed the mark", which is marketing speak for "we really messed up on this one. Erm, sorry".

Computer Error Brings Discounts For All

Yay! By which, we mean: 'oh dear...'

The East of England Co-op is a collection of over 200 branches operating around Essex, Suffolk and Norfolk and shoppers in Clacton were delighted as a 20% discount was introduced across a range of products in time for the festive season. The promotion was particular to that store and should have been easy enough to administer, except that the group's computers didn't just administer the offer at the Clacton store.

No, computers ended up bringing some early Christmas cheer to shoppers at every one of its stores across the region, leading to a £43,000 loss in revenue for the group. The retail officer for the group was quoted by the BBC as saying that he was "flabbergasted" (great word), and that it took a day and a half for the computers to stop putting discounts on everything.

Computers, eh? More trouble than they're worth.



Asus Transformer Book T100HA

A two-in-one tablet/notebook that ticks all the right boxes

DETAILS

- Price: £299
- Manufacturer: Asus
- Website: goo.gl/3qBPXB
- Requirements: Windows/Microsoft account, SD card for improved storage capacity, 10.1" case to avoid damage

The two-in-one convertible tablet/notebook form is doing surprisingly well at the moment. Most, if not all, of the big names have a version released with some slight change in the processing power or in the way the keyboard section attaches to the tablet section. Generally speaking, they all work more or less the same. Or do they?

The latest two-in-one offering from Asus may well make us reassess that statement. The T100HA is a fine example of mixing a tablet with a notebook, and the Intel Cherry Trail quad-core Z8500 processor runs at 1.4GHz with a burst frequency of 2.24GHz and manages to drive the 10.1" T100HA along a decent pace. The 2GB of LPDDR3 is enough for most tasks, and there's a 64GB eMMC hard drive fitted with a copy of Windows 10 64-bit pre-installed.

Connectivity is good too, with the tablet section housing a micro-HDMI port, USB Type-C port, micro-SD card slot, and a microphone/headphone port. The keyboard section, or base if you prefer, increases the port numbers with a full-sized USB 2.0 port. Furthermore, there's a 2MP front camera on the tablet, and a 5MP rear mounted camera.

Obviously you get the usual 802.11 a/b/g/n wi-fi and



▲ The Asus Transformer Book T100HA is a pretty good tablet convertible



▲ It may not be the prettiest convertible on the block, but it's a good performer

Bluetooth 4.0 as well, but all this is neatly fitted into the dark grey, anodised aluminium case of both the tablet and keyboard/base sections. It may not be the prettiest convertible to ever grace the desk, but it's certainly functional, and it doesn't look too bad.

The design of the T100HA works well, though. The tablet section pops on and off the base with a little tug to break the magnetic strip that keeps everything together. This makes the task of separating and bring the two together faster and more

efficient. The 0.58kg tablet section and 0.46kg base combined are still light enough to carry on your person, and since it only measures 265 x 175 x 8.45mm with an added 10mm to the thickness for the base, it's not a bad size either.

The keyboard section has the keys spread right to the edges, within a few millimetres, of the base. This gives just enough room for the keys to be reasonably well spaced apart to make for a comfortable typing position, and the trackpad below is wide enough to easily use the various

gestures and so on to navigate Windows 10's features.

In terms of performance, the T100HA did remarkably well. Geekbench 3 returned a combined processor score of 2,898, which is quite good and better than other convertibles we've tested in the past.

While it won't play *Fallout 4*, though, the T100HA does an admirable job of navigating Windows 10, its apps and the usual array of word processing, web browsing and media viewing tasks. It's predominantly a work/light play device, and it fits the role suitably without trying to hit above its weight and failing.

The screen has a maximum resolution of 1280 x 800, which in some respects can be limiting for those who want more detail from their graphics. However, it manages to produce a clear IPS-like display that's easy on the eyes and looks good from a multitude of angles.

The Asus Transformer Book T100HA is a great little 10.1" convertible. It's perfectly priced at around £299 and does a great job as a work and social tablet/notebook, and the battery lasted for a good eight hours of normal, office use too.

mm David Hayward

A well-priced, and decent performing convertible



Plinth

Clever engineering makes this accessory stand out from the crowd

DETAILS

- Price: £14.95
- Manufacturer: Plinth
- Website: goo.gl/EQnmAI
- Requirements: Any kind of phone or tablet

After a successful Kickstarter campaign, designer John Bull has finally managed to manufacture his unique tablet and phone stand, the Plinth.

The £32,000 raised through Kickstarter investment has already proved that the public are behind this design, but until now we haven't had the opportunity to actually try out the Plinth for ourselves. So what's makes this tablet stand better than the competition?

Admittedly, it's a saturated market in terms of tablet and phone stands, so the Plinth needs to be able to, excuse the pun, stand out from the crowd. Thankfully, it manages to do this through some clever design features.

Pulling the Plinth out of its box reveals a fairly unremarkable-looking, lightweight plastic rectangle. But by pressing the sides in the Plinth springs up and out to form a T-shape with extended arms that can hold the back of a phone or tablet.

There are a set of rubberised pads at the bottom of the Plinth to stop it from sliding around, with an additional rubber section along the cradle where the device will sit. The extended arms allow you to angle the Plinth according to your use and comfort. Ergonomically speaking, the Plinth is by far the best stand we've used,



▲ By squeezing the edges, the Plinth springs into action



▲ It's capable of holding any tablet or phone at a variety of comfortable angles

and we've been through quite a lot over the years.

Considering the Plinth itself weighs less than 50g and looks quite flimsy, it's actually a remarkably robust and sturdy stand. It can easily hold any make and model of tablet, even within some of the more chunky cases available, without fear of it toppling over under the strain. In fact, we loaded it

up with a rather heavy Acer Iconia W500, and it remained perfectly stable even with us pawing at the screen for quite some time.

Returning the Plinth to its compact state simply requires you to fold down the raised sections and fold in the arms, then everything clicks back into place neatly. In its compact form, the Plinth measures just

110 x 65 x 10mm, which means it's small enough to fit into your pocket or bag. Once you're ready to get your tablet or phone out and work from it, all you need to do is snap open the Plinth, and you're able to use it in a matter of seconds.

The Plinth is a great tablet and phone stand. It's sturdy, tough, light and compact, and it can cater for larger tablets easily. One thing we would like to see is a channel that can accommodate the power cable, where you can sit the tablet or phone while it's still charging. You can separate the arms that hold the tablet in place slightly, but that raises the height of the Plinth above the rubber feet, so perhaps raising the level a few millimetres will allow you to run the cable while it's in the stand. That of course only applies to tablets or phones that have the port located at the bottom of the device.

Overall, we really like the Plinth. For a mere £14.95 via the Plinth site and available in a range of colours, it's a fantastically engineered tablet stand and one that'll certainly last you far longer than the device it's holding.

mm David Hayward

Perfect for any type of tablet or phone



Western Digital My Cloud Mirror 4TB (Gen 2)

Mirror, mirror on the wall. Who has the most personable cloud of them all?

DETAILS

- Price: £249.99
- Manufacturer: Western Digital
- Website: wdc.com
- Requirements: Ethernet network and broadband connection

Unboxing the Western Digital My Cloud Mirror (Gen 2), I experienced a degree of déjà vu, because it's structurally identical to its previous My Cloud Mirror and My Cloud RE2 designs.

While the curved chassis is undoubtedly the same, what I was curious to discover was how much computing platform they also share. The first-generation My Cloud Mirror had a single-core 1.2GHz CPU, whereas this has a modestly superior dual-core 1.3GHz Marvel ARMADA 385. With more processing power comes more possibilities, surely, and hopefully more features.

How this and its younger brother differs from the RE2 is that it supports SNMP, DFS, Active Directory, iSCSI and Volume Encryption, because it's made for business users, and the My Cloud Mirror isn't.

The focus here is the home user who wants to secure his personal data in a way that doesn't rely on Google, Microsoft or Dropbox, to name but a few cloud providers.

If you want to take responsibility for your own data, then it's probably a good idea to properly secure it against hardware failure, and the 'Mirror' in this title refers to the drive mirroring that the system inherently promotes.

You can use the two internal drives in a striped mode, giving you double the space and twice the chance of losing it all, but that isn't how the My Cloud Mirror was meant to operate.

The review model came with dual 2TB WD Red drives,

but you can buy it with 2x 3TB and 2x 4TB if you need the extra capacity. What's important to realise is that the mirroring only gives you half the labelled capacity, so the 4TB review model only has 2TB of space. Critically, though, it will continue to secure your data if one of the drives dies.

This is certainly an improvement over the single-drive My Cloud, but you do pay for that privilege.

The 2TB version of single drive My Cloud is £99.93, and if you buy two of them they'll give you the same capacity, and you're covered not only for drive failure, but also one of the boxes dying entirely. And you could even place each one

in a different physical location and possibly sync them across the internet.

And you can get that for £50 less than a single My Cloud Mirror 4TB would cost you.

However, the Mirror does have a few tricks up its drive slots that swing the balance back a little in its favour. In addition to having a more powerful CPU, it also supports FTP, a server backup model and a P2P BitTorrent client.

That this hardware has installable apps is probably one of its strongest features, if only Western Digital could be convinced to release more. Above the ones pre-installed, there are just 11 listed – a tiny fraction of what Synology offers on its NAS platform.



The My Cloud Mirror Product Range

Models	Size	Cost
My Cloud Mirror	4TB	£249.99
	6TB	£309.99
	8TB	£379.99



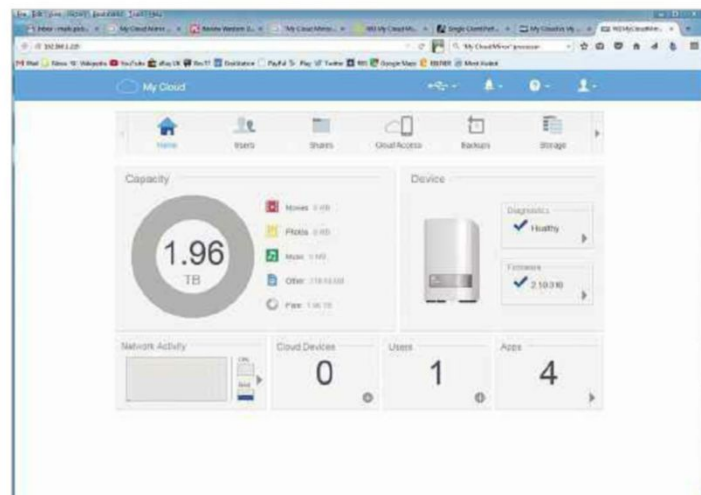
Why there aren't more is possibly down to how technically minded you need to be to configure some of the ones provided, because these are in stark contrast to the generally home-user-friendly nature of the My Cloud OS3 interface and feature set.

What it doesn't lack are the USB 3.0 ports. It has two, so you can hang more external storage off it.

But easily the best reason for going with the Mirror is

the speed, because even in RAID 1 configuration, this is an exceptionally punchy performer. Depending on the size of file being accessed, I recorded speeds on a gigabit LAN of greater than 100MB/s for both reading and writing. If no other reason convinces you that this is a better choice than the single drive My Cloud, then that should be it.

As with the other My Cloud devices, you get a complementary three-user licence for WD SmartWare Pro,



and you can also use it with Apple Time Machine.

Undoubtedly the best utility is WD Sync, which allows you live backup selected folders on multiple PCs to the My Cloud Mirror. There are also mobile apps to sync phone and tablet data to the unit.

My only real complaints from a software perspective are that even with two USB ports, Western Digital couldn't allow one to be used to share a printer or support a USB wi-fi adapter.

In terms of value, I initially thought the 6TB model is probably the best deal. Then I calculated bare drives costs, and realised that the hardware costs least with 2TB drives; the 4TB is next and 3TB drives are the least economic.

How practical an alternative this is the likes of Google's Cloud services entirely depends on how you currently use it. But for some this could provide not only a rapid local NAS solution but a means to synchronise files over a wide range of devices and geographic locations.

mm Mark Pickavance

	Read [MB/s]	Write [MB/s]
Seq QD16	91.08	118.3
4K QD16	1.105	2.183
Seq	101.3	108.0
4K	1.849	2.121

**A fast NAS box
with inherent drive
redundancy**



Toshiba Satellite Click 10

Toshiba redefines the hybrid as the small and portable computing platform

DETAILS

- Price: £279.99 (Argos)
- Manufacturer: Toshiba
- Website: www.toshiba.co.uk
- Model reviewed: LX0W-C-104

I find it fascinating that Microsoft with the Surface range has convinced everyone that hybrid designs are the future, when there is no commercial evidence at all.

Lenovo, HP, Acer and Dell are all making them, and here we have one of Toshiba's hats in that ring, the small and well-specified Satellite Click 10.

What printed pictures don't well convey is how small a mobile PC the Click 10 is. It's just 25.5cm wide, with a 10.1" display, making this a system that's designed to travel easily at a few grams over 1kg.

What that scale doesn't allow for is much space on the keyboard, with some of the minor keys reduced to just 1cm wide. That said, it's possible even for me to type

on it, and the rest of the specification is actually better than I was expecting.

Built around Intel's Atom x5-Z8300 processor (Cherry Trail), it comes with 2GB of RAM, 32GB of storage and Windows 10 Home 64-bit already installed.

As notebook hardware goes, that's not at all bad, and it also

has a rather lovely 1080p IPS touch display that's remarkably crisp and colour vibrant.

Normally, this type of machine would get away with omitting touch, but the Click 10 doesn't have that option, because the screen portion can entirely detach and function independently as a tablet.

But that isn't as great an idea as it might initially seem, because once you do that, you no longer have access to the two full-sized USB 2.0 ports on the keyboard part, and that also disconnects a second battery. And because the charger plugs into the tablet part, you can only charge them both when they're connected again.

Having used this for just a few hours, I began to realise that most people will rarely, if ever, disconnect the two parts – partly for the previously

mentioned reasons, but also because it forces you to hold the tablet where connected to the keyboard it stands up entirely unaided.

However it's held, the display is certainly a strong point, and so is the great battery life. Toshiba makes the rather bold claim that it can work for 15 hours on both batteries, but that really depends what you do with it. More than ten hours is believable with some power management, and even heavy users should get a working day out of the Click10.

The x5-Z8300 processor is also significantly more responsive than the previous Atom generation, and for typical Office jobs, this is a perfectly workman-like solution.

That's where my review would have ended, had Microsoft not released the November Upgrade to



Specifications

- **Model number:** Click 10 lx0w-c-104.
- **Display:** 10.1" 1080p IPS multi-touch panel
- **OS:** Windows 10 Home 64-Bit pre-installed
- **CPU:** 1.5GHz Intel Atom intel atom z8300 quad-core processor.
- **Memory:** 2GB RAM, 32 GB internal storage.
- **Networking:** Wi-fi, Bluetooth
- **Ports:** 2 x USB 2.0. mini-HDMI. micro-USB. 3.5mm stereo headphone jack.
- **Extra features:** Webcam, microphone, built-in speaker.
- Up to 15 hours' battery life (depending on usage).
- **Size (HxWxD):** 18.5cm, 25.9cm, 2.2cm
- **Weight:** 1.1kg.



wouldn't need to worry about what upgrades Microsoft might have planned going forward.

Nothing about this actually convinces me that hybrid machines aren't just a compromise that most people would do without. However, on the upside, it does make for better quality displays even in cheap laptops, and that development should be warmly welcomed.

mm Mark Pickavance

A good notebook and a mediocre tablet in one



**“ Even with 64GB,
this machine would be
transformed ”**

Windows 10 – something that caused massive capacity problems with this machine.

It wasn't what Microsoft released as much as how it was meant to download and install onto a working system with just 15GB free. The download and install process took hours, quite literally.

When it had finally elevated the version number, there was barely 5GB left free,

disturbingly. Remember, this is a machine that I've not installed any apps or data onto; it was entirely fresh from Toshiba. Had I taken up 5GB or more of space, I suspect it would not have been possible to upgrade without external storage.

You can get some of that space back by dumping the ability to regress to the previous version, if you're

technically minded enough to find that option.

It didn't really help that Toshiba treated the Click 10 like one of its desktop machines, installing all manner of junk on it for the customers to delete later at their leisure. There's easily a gigabyte taken up that way, which it could well do with back.

The current Universal App selection makes this a dubious tablet but an acceptable notebook system, but you'll need to add more storage via micro-SD card, because 32GB just isn't enough to be really useful.

Even with 64GB, this machine would be transformed, and you

Roccat Kiro

An ergonomic mouse, with some clever features

DETAILS

- Price: ~£38
- Manufacturer: Roccat
- Website: goo.gl/sbn9XE
- Requirements: OS independent, Windows 7 or later, for Swarm software, USB port, 3D printer to make new modules

Roccat's splendid line-up of gaming mice has a new arrival in the form of the Kiro, a modular ambidextrous gaming mouse with a unique design taken from the company's Nyth range.

Looking to the technical specifications first, the Roccat Kiro is certainly an eye-opening mouse. Within its ergonomically designed body, you'll find a Turbo Core V2 32-bit ARM-based processor at 75MHz and with 576KB of on-board memory.

It has a native DPI of 2000 through the Pro-Optic R2 sensor, but the sensor can effectively overdrive the DPI up to a pretty decent 4000, making the Kiro a good gaming peripheral for those who prefer a higher than normal sensitivity setting.

The 1ms response time, 20G acceleration and 1.5m/s maximum speed put the Kiro on the same level as the more high-end examples from Roccat's range of mice. However, the emphasis isn't so much leaning towards serious gamers. It's the design of the Kiro that makes it stand out from the crowd.

Following on from the introduction of self-3D printing modular parts, from the Roccat Nyth gaming mouse, the Kiro features two removable sides that can be swapped out for a buttoned or blank side. The sides

▲ The Kiro is a comfortable mouse, with a rubbery grip and removable sides



▲ You can custom 3D print your own modules to fit to the Kiro

themselves can be 3D printed, with the STL files available via the Roccat site, with many more user based designs soon to follow.

The use of custom made 3D printed modules is a concept we find very interesting. Naturally, the Nyth had more buttons available to it, with the Kiro having eight possible button clicks, but as this is an ambidextrous (or, as Roccat refers

to it, Super-Dextrous), you can swap out the sides depending on what hand you prefer, and you won't accidentally hit any buttons that were designed for a right- or left-handed user.

Furthermore, the Kiro has a rubberised effect feel to the set of default sides, which give it a non-slip grip.

For us, the main draw of a mouse isn't so much the fact that

it can display 16 million LED colours or that it has a processor inside that's nearly as powerful as some laptops we still use; it's how it feels in the hand and how it performs not just in gaming, but also in everyday tasks.

Thankfully, the Kiro managed to tick all our comfort and functionality boxes. It feels a little wider than the Roccat Tyon, and it rises gently into the palm for a more comfortable grip. Ideally, it could do with being a centimetre or two wider, since we seem to have bigger than average hands, but we never felt like we were assuming a 'claw' grip during its use.

The 4000dpi rating is more manageable to control over the much higher settings of the Tyon and the Nyth. It's good enough for fast-paced gaming, and it can easily accommodate more general computing tasks without becoming an annoyance.

On the whole, the Roccat Kiro is a splendid, comfortable and technically interesting mouse. There's plenty to enjoy about it, and it's priced pretty well to at around £38. All in all, a good example of design and technology.

mm David Hayward

Well-designed, comfortable and technically impressive



Steam Controller

Has PC gaming evolved, or has Valve taken on too much?

DETAILS

- Price: £40
- Manufacturer: Valve
- Website: goo.gl/TyZCDW
- Requirements: USB port, Steam client

Valve certainly savoured the media attention it got for the long-awaited Steam Controller. We were tantalised with brief images, we marvelled at the technical specifications, and we were bombarded with pre-launch videos of whooping gamers claiming it was the most marvellous thing ever created. But is it?

With the Steam Machines now here and the Steam Link on the shelves, the Steam Controller can finally have its day in the limelight and in your living room. It's a kind of Frankenstein's monster combination of a keyboard, mouse and gamepad, designed to fill the gap between PC gaming and consoles.

It features two large touchpads to either side of the controller body. The one on the left is a D-pad arrangement, with a decent tactile feedback, and the other is a solid touchpad with a push button. Both have quite a powerful haptic feedback and work well in some of the games we tested the controller on.

The four action buttons can be found in the lower right of the controller and are very similar to that of an Xbox controller. They are quite small in comparison, though, and feel a little close together, to the point where it's easy to hit the wrong button.

In addition, there's an analogue stick to the lower left, which feels really good and is a solid build, with a rubber grip to stop your



▲ The Steam Controller has a lot going on



▲ It's a decent controller, but it needs some updates and more configuration choices

thumb slipping off. There are also a pair of triggers under each index finger, and added to the mix are a pair of paddles on the rear of the controller, which cover the battery compartment.

The buttons, touchpad and feedback from each feel good, and they're certainly responsive enough. The rear paddles take some getting used to, and you'll find yourself tapping them by accident from time to time. But on the whole, it's not bad.

The Steam Controller is slightly different from the usual PC, PlayStation or Xbox controller. It's roughly the size of an Xbox pad but a lot thicker in places, which makes it feel a bit better to hold. Having said that, we do have bigger hands, and when we tested it with a 13-year-old, she did complain that the controller felt a little too big for her to reach the touchpads comfortably.

Hooking up the Steam Controller is simple enough. It comes with a length of USB cable, a Bluetooth receiver dongle and a USB extender so you can work the Bluetooth dongle up through the back of your TV unit and place it next to the TV for a direct line of sight.

Out of the box, and once the included pair of double-A batteries were fitted, it worked straight away on our Steam Link. The only major issue was the notice of an update to the controller that required us to plug it into the host PC.

When connecting it to your PC, you'll need to run Steam in Big Picture mode. If not, you'll find the controller ends up in a haptic feedback loop, while slowly moving the mouse pointer across the screen. Once in Big Picture mode, it returns to normal and will be ready to be configured from the Settings option.

In game, though, things didn't quite go according to plan. While it worked in a lot of the games we own on Steam, there were quite a number that really didn't like having the Steam Controller plugged in. They either didn't work at all or had some strange input reactions to the button presses, some of which seemed totally random and changed from button to button.

Of course, you can apply custom Steam Controller configurations to some games, but these are still quite limited. Mostly, the controller works, although the touchpad does feel a little sensitive for the majority of games. Remapping the buttons is easy too, but it's a time consuming affair, and if you're coming from a console to Steam, it's no doubt something that you'll find extremely annoying.

For around £40, it's not a bad price for a feature-laden PC controller, but you get the feeling that it's trying to be a jack of all trades but sadly a master of none. As a controller, it's okay; as a replacement for a keyboard and mouse, it's not good.

It'll take some getting used to, but with regular updates and support it could be better over time. **mm David Hayward**

Good, but doesn't quite live up to the hype



GROUP TEST

8" Tablets

Where once the 10" tablet was king, a new generation of powerful and competitively priced 8" tablets are beginning to emerge.

With the right combination of performance, style and features, we have six to test to see which could fill your Christmas stocking this year.

8" Tablets

Nvidia Shield Tablet

DETAILS

- Price: £150
- Manufacturer: Nvidia
- Website: goo.gl/bF6f3u
- Requirements: Android account. Ideally, a Nvidia controller too, but not necessary

Since it was released, the Nvidia Shield has evolved into an Android set-top box, controller and remote as a single package. However, it began life as a tablet and has since been upgraded slightly.

Although Nvidia is pushing the set-top box version of the shield these days, the last version of the Shield tablet, released last year, is still available and still worth checking out if you're in the market for an 8" device.

At its core, you'll find a 2.2GHz ARM Cortex A15 processor, a custom built Nvidia Tegra K1 192 Kepler GPU, 2GB of memory, an 8" 1920 x 1200 full HD screen and 16GB of storage. Also, there's 802.11n 2x2 MIMO dual-band wi-fi, Bluetooth 4.0, GPS, three-axis gyro, accelerometer and compass included within the Shield, but you also get a mini-HDMI port, micro-USB, micro-SD card slot and a 3.5mm audio port. Added to that is a 5MP front facing camera and a 5MP HDR camera.

The build quality of the Nvidia Shield is very good indeed. Its metal body is finished with good-quality plastic sections that give it a soft, almost rubbery feel. And there's a slight curve to the rear of the Shield, which fits the contours of the hand and aids comfort considerably.

The various power and volume rocker buttons line up

▲ *The Nvidia Shield Tablet is certainly powerful enough for gaming*

► *It's overkill for most everyday tasks, but it's still great*

along the right-hand side of the tablet, with other ports scattered across the top edge and a pop-out stylus in the bottom corner that activates a menu when it's removed from its port. There are also a pair of slots on the left-hand edge that are used to connect the Shield Cover, which can then form a triangle on which the Shield is propped up. It's not a part of the package, and it does cost in the region of £25 extra to buy, but thankfully it's not totally necessary.

The display on the Shield is certainly good, and since it's primarily a gaming tablet, we'd expect it to be. However there are other tablets, within this group too, that do have a clearer and better colour producing screen. It's good, don't get us wrong, but we've seen better.

The tablet we have originally came with Android 4.4 installed. A quick update, though, brought us Android 5.0, as well as updates for the various Nvidia apps that come



pre-installed. Incidentally, the amount of Nvidia apps is limited, consisting of the GeForce cloud gaming service, Console Mode, Nvidia Dabbler and Shadow Play. The other apps are stock Google Play store, Chrome and so on.

The Nvidia Tegra is the crown jewel of the Shield, and it drives the performance of the tablet with a GeekBench 3 score of 3,210 in the multi-core test. It's a powerful little tablet, that much is obvious and it'll play the latest Android games without too much difficulty. But you'll ideally need the Shield Controller to get the best gaming benefits from the tablet.

The Nvidia Shield is a great gaming tablet, and when combined with the optional extras, such as the controller, it really shines. In terms of more everyday stuff, it's certainly an excellent device but perhaps a little overkill.

Samsung Galaxy Tab S2 8.0

DETAILS

- Price: £345
- Manufacturer: Samsung
- Website: goo.gl/iftLbyK
- Requirements: Android account, Samsung account for some specific apps

Samsung's tablets from the last few years are astonishingly good.

We still have a Note 10.1 from 2012 that shows no signs of slowing down, so as you can imagine, we were happy to get our hands on the flagship mini tablet from the company.

The Galaxy Tab S2 8.0 is the Samsung's iPad-Mini-beating 8" tablet. The impressive Exynos 5433 octa-core 1.9GHz processor, 3GB of memory and 32GB of storage push the bar a little higher in terms of performance and help power the 2048 x 1536 QXGA Super AMOLED display along at a rate of knots.

For connectivity, the Galaxy Tab S2 features 802.11 a/b/g/n/ac dual-band wi-fi, Bluetooth 4.1, micro-SD card slot, micro-USB, MHL2 port and a 3.5mm audio port. There's also a front-facing 2.1MP camera and a rear 8MP camera, along with a fingerprint sensor and all the usual accelerometer functions.

The design of the Galaxy Tab S2 is excellent. The mix of metal, top-quality plastic and Gorilla Glass make this a sturdy and splendid-looking tablet. The ports circle the outer edges of the tablet and are well placed and easy to access when you have the charger in place.

The display is something

▲ *The Samsung Galaxy Tab S2 8.0 is an exceptional tablet*

that Samsung should be very proud of, as it's quite simply one of the best we've seen on a tablet in a long time. The Super AMOLED screen is of exceptional quality, clear

The Galaxy Tab S2 comes with Android 5.0.2 with a few updates to the pre-installed apps needed after you've powered it up. The usual Android mix of apps are

“ All this processing power, build quality and performance comes at a price ”

and with some superb colours and brightness levels. The built-in Adaptive Display feature, which will automatically adjust the levels of brightness and contrast according to the current environmental light levels, works well. But we did find ourselves turning it off after a while and opting to control the levels manually.

present, and there's a host of Samsung-made apps and productivity programs available. Yes, there's a fair amount of bloatware, which we've come to from Samsung devices, but there's a lot less than there used to be, when you consider the aforementioned Note 10.1 from a few years ago.

As for performance, the Samsung Galaxy Tab S2



▲ *It's a little expensive considering the competition*

doesn't hold back its punches. The Geekbench 3 score of 4,215 blew the Nvidia Shield away by over a thousand points, which naturally means the Galaxy S2 is more than capable of both high-level gaming as well as media streaming, presentations or just browsing.

The Samsung Galaxy Tab S2 8.0 is a splendid tablet and one we're quite smitten with. However, all this processing power, build quality and performance comes at a price. Whereas the Nvidia Shield cost roughly £150, the Samsung Galaxy Tab S2 is a wallet-emptying £345 – well over twice the price.

If you can afford one and you're a Samsung fan, then the Galaxy Tab S2 is a wonderful tablet. If it's going to be chucked next to an armchair while checking Facebook and IMDBb, then a cheaper model will be a better solution.



8" Tablets

Asus ZenPad 8.0 Z380C

DETAILS

- Price: £99
- Manufacturer: Asus
- Website: goo.gl/ssd9Rh
- Requirements: Google account, Asus account for cloud storage

We had a couple of Asus Zenpads in for review recently, and while good on their own, we thought it would be interesting to see how they perform next to other 8" models.

The first Asus tablet is the Z380C, which has an Intel Atom x3-C3200 quad-core 64-bit processor running at 1GHz and 2GB of memory. There's 16GB of storage available, on which a copy of Android 5.0.2 is installed, along with a selection of Asus related apps.

The Mali-450 MP4 GPU manages to kick out enough graphical detail to drive the 8" LED backlight WXGA IPS panel to a maximum resolution of 1280 x 800. The screen has an anti-fingerprint coating and Asus Tru2Life technology, which helps give it a higher than average quality and of course keeps the smudges to a minimum.

There's the usual 802.11 b/g/n wi-fi, Bluetooth 4.0 and Miracast support, with a micro USB port for charging, a two-in-one audio jack and micro-SD card slot that supports cards up to 64GB in size. The 2MP front and 5MP rear cameras complete the standard array of tablet technology.

The design of the Z380C is good, with a stark white plastic bezel and surround

▲ *The Asus ZenPad Z380C certainly looks good*



▲ *The Tru2Life technology make for a great screen as well*

with metallic looking volume and power buttons to one side. The rear of the Z380C has a removable and textured polycarbonate cover that can be swapped out for a range of colours to appeal to the user in question, with each cover costing around £14. It's obvious it's a cheaper tablet than some of the other models in the group, such as the Samsung or the Nvidia Shield, but the build quality is actually good, and on its own you'd never know the

difference or even think this is cheap.

Out of the box, the Z380C came with Android 5.0 installed, along with a set of Asus apps such as ZenMotion, which allows the user to create custom gestures and various productivity apps. You also get 5GB of Asus cloud storage for the life of the device and 100GB of Google Drive space for two years. And of course there's the usual array of Google and familiar Android apps bundled too.



In terms of performance, the ZenPad Z380C didn't quite match up to the levels of the Galaxy Tab S2 or the Nvidia Shield. In fact, it scored a rather paltry 1,195 on the GeekBench 3 multi-core benchmark – a good 3,000 shy of both tablets from Samsung and Nvidia.

However, even though it's a low score and the Z380C doesn't seem very powerful on paper, its real-life performance levels are more than enough for those who require a basic media tablet. You may struggle with some of more demanding Android games, but the majority will run fine, and you'll have no problem streaming media or visiting the usual online social media sites.

While the Asus ZenPad 8.0 Z380c may seem like a poor relation to the more powerful tablets in the group, it's really quite a good buy. For just £99, you're getting a tablet that's capable of everyday tasks, lightweight gaming and which would make for an ideal ebook reader.

Asus ZenPad S 8.0 Z580CA

DETAILS

- Price: £159
- Manufacturer: Asus
- Website: goo.gl/2b4DNo
- Requirements: Google account, Asus account for cloud storage

Following on from the Asus ZenPad 8.0 Z380C, we now have the company's flagship 8" tablet in the form of the ZenPad Z580CA.

Inside you'll find an Intel Atom Z3560 quad-core 64-bit processor running at 1.83GHz (boost to 2.33GHz), with 2GB of memory and 32GB of storage.

The GPU is an IMG PowerVR Series 6, which drives a rather splendid LED backlit, QXGA, IPS panel that can display an impressive resolution of 2048 x 1536. And as with the other Asus model in the group, the screen is coated in an anti-fingerprint layer and has active pen support and Asus Tru2Life+ technology.

As for connectivity, the Z580CA has Bluetooth 4.1, 802.11 a/b/g/n/ac and support Miracast and you'll find a USB type-C port, two-in-one audio jack and a micro-SD card slot with support for up to 64GB cards.

There's a 5MP camera at the front of the tablet, with an 8MP camera at the rear. Both take excellent images and videos with various touch-up elements and beautification settings to apply after taking the picture. Video can be shot at resolutions up to full HD, while also offering various enhancements.



▲ The Asus Z580CA is an exceptionally good tablet



▲ It looks great and it performs well too

“ The quality and workmanship of the Z580CA is excellent ”

The build quality of the Z580CA is excellent, with a modern mix of metal, metallic-like plastic and Gorilla Glass. The back isn't removable, as it was with the Z380C models, but it's made of aluminium, with a faux-leather finish to the bottom edging. The quality

and workmanship of the Z580CA is excellent, giving it the feeling of a far more expensive tablet very much like that of the Galaxy Tab S2.

Out of the box it runs Android 5.0, with a small selection of Asus apps pre-installed. These consist of various productivity tools,

Amazon Kindle, Trip Advisor and a launcher to Ludigames. Naturally, there's the usual Google Play store, and you also get three specific ZenPad apps that allow you to connect to a PC or to the tablet remotely. Overall, they're okay but, more importantly, they won't get in the way of you personalising the apps yourself.

The performance of the Asus ZenPad Z580CA is better than that of its sibling the Z380C, obviously. The GeekBench 3 multi-core score was a decent 2,460. The numbers are pretty good and show that the ZenPad S 8.0 Z580CA is more than capable of running performance hungry apps and games without too much difficulty.

The price of the Asus ZenPad S 8.0 Z580CA isn't too bad either. Considering you're getting a beautifully presented and well specified tablet, the current price of £159 is pretty good and puts it in the same cost category as the Shield.

Overall, the Asus ZenPad S 8.0 Z580CA is an excellent tablet. It performs exceptionally well, is light and has an amazing display and is well priced too. All in all, a great 8" tablet.



8" Tablets

Acer Iconia One 8

DETAILS

- Price: £99
- Manufacturer: Acer
- Website: goo.gl/2fyflj
- Requirements: Google account for app store

The Iconia One 8 actually arrived on the shelves last year, but since then the company has released a few updated models with various B-themed version numbers.

The one we have for this group is the B1-820, which has a reasonably powered Intel Atom Z3735G quad-core 1.33GHz processor, 1GB of memory, 16GB of storage capacity and a similarly decent WXGA 1280 x 800 screen.

Connectivity comes in the form of 802.11 b/g/n, Bluetooth 4.0, a micro-SD card slot, micro-USB and a 3.5mm headphone socket. There's also the rather odd choice of a 0.3MP front facing camera, but a better 5MP rear camera. The front camera is pretty poor, especially in today's iPhoneographer world of decent images from a tablet or phone; we can assume Acer was keeping the cost down in this respect, though.

The design is okay: lightweight with a dimpled plastic back for better grip and a large glossy bezel with the company logo in silver. It probably wouldn't win any awards for the design, and it doesn't have the more appealing, higher-quality plastic that the models from Asus, Samsung and Nvidia have, but it's functional enough for the vast majority of users.

The performance of the Acer Iconia One 8 came out



▲ The Acer Iconia One 8 is an above average tablet



▲ Unfortunately, for just £50 more, you can have something far better

at 2,018 on the GeekBench 3 multi-core benchmark. That's an okay benchmark, and it'll play most titles well enough, but it will struggle with the more graphically intensive games. However, for regular browsing and streaming media, it'll do the job.

Incidentally, the screen on the Iconia One 8 uses a technology called Acer Precision Plus, which is designed to improve the sensitivity of the touchscreen. The Precision Plus technology uses a smaller and tightly packed group of sensors to

improve the finer details of the touchscreen, so you're able to use objects such as a pencil to draw accurately on the screen.

Out of the box, the Acer Iconia One 8 ran Android 5.0, and there were the usual Google and Android apps. But these were lying under a collection of Acer apps and shortcuts to various sites and services. There are a few interesting options that some users may like, such as the System Doctor, and the EZ Note app works in conjunction with the screen technology to allow you to write with an actual pencil – which is a far better method than a stylus, in our opinion.

The majority of apps and EZ Gadgets shortcuts, as Acer calls them, are pretty useless and contribute to the abundance of clutter the Iconia One 8 has as soon as you power it up.

The Acer Iconia One 8 isn't a bad 8" tablet, though. Sure there are better performing models available, but considering the Iconia One 8 costs around £99, it's certainly worth considering. You'll need to do some housework on it first, getting rid of a large number of Acer installed shortcuts and so on, but in the end you'll have a decent tablet.



Linx 810b

DETAILS

- Price: £99
- Manufacturer: Linx Tablets
- Website: goo.gl/OfXUv1
- Requirements: Windows/Microsoft account



▲ *The Linx 810b performs well*



▲ *Is there a question mark when it comes to build quality?*

Linx tablets seem extraordinarily good when viewed on a website or on paper. However, when you actually come to use one, you'll often find it lacks some much needed punch when carrying out everyday duties.

That's not to say that every Linx product is a dud; in fact, our Linx 10 tablet is working well. It's just that the range always seem to appear in the 'I wish I hadn't bought this' section of many forums.

Perhaps, then, the Linx 810b may turn that opinion around? This tablet has an 1.33GHz quad-core Intel Atom Z3735F, 1GB of memory and 32GB of storage. The screen is a surprising 1280 x 800 IPS display, driven by the Intel HD Graphics GPU, and it's really quite good.

Connectivity consists of micro-HDMI, micro-USB, a micro-SD card slot and a 3.5mm audio port. As you would expect, there's also 802.11 b/g/n wi-fi and Bluetooth 4.0, and you get a pair of 2MP front and rear facing cameras.

Build quality isn't great, but it's not too bad either. Sure, it feels very cheap, especially when compared to some of the other tablets we have on test, but the rubberised plastic back cover provides a good grip, and it's better than the usual fingerprint-attracting

glossy plastic we often see at the budget tablet level.

Out of the box, the Linx 810b runs Windows 10 32-bit Home edition, which seems a little odd for a 64-bit processor in this day and age. You get about 16GB left on the internal storage, from

the initial 32GB, but you can always increase that amount by removing one or two apps that come pre-installed. Incidentally, there's also a year's subscription to Office 365 included as standard.

As for performance, we were quite surprised by how

well the Linx 810b scored. The GeekBench 3 benchmark managed a score of 2,081. We're not sure if there's a significant difference between the Android and Windows versions of the benchmark, but we found Windows 10 to run fairly smoothly as well as a few Windows Store games.

All in all, the Linx 810b isn't a bad tablet. But you may prefer an Android tablet over a Windows 10 one, in which case you'll more than likely opt for the Asus or Acer, since they're in the same price range as the £99 Linx 810b.

The main problem, however, is with the longevity of the Linx 810b. Obviously, the brief time we had it for, it worked well, but we've seen so many Linx tablets that have suffered some form of problem (battery, power, screen, storage and so on) in recent months that we have to take this into account. Hopefully, you'll have no trouble at all throughout the life of the Linx 810b, but if you're unsure about buying one, it's best to check out the forums first to see what the common problems are.





Asus ZenPad S 8.0 Z580CA

Although the Asus Zenpad S 8.0 Z580CA isn't the most powerful tablet in the group, it's one of the better designed and competitively priced models.

With the right mix of speed, style and price, it's this week's winner and one you should really consider for your next upgrade.



Nvidia Shield Tablet

The Nvidia Shield Tablets isn't just for gamers. It may appear a little excessive in terms of the gaming-focused processor, but it's a really good tablet and one that'll hold up its performance for some time to come.

It's also decently priced. In fact, you could buy this and the Asus Z580CA for the price of the Samsung Galaxy Tab S2.

How We Tested

Each tablet was tested with a collection of games: *Bloons Tower Defence 5*, *Plants Vs Zombies 2* and *Rayman Adventures*. We also tested some productivity apps and the camera, as well as browsing through some basic sites such as BBC News, Facebook and IMDb. We ran a few HD streamed films from a local NAS drive and ran GeekBench 3, recording the multi-core speed score.

	Nvidia Shield Tablet	Samsung Galaxy Tab S2 8.0	Asus ZenPad Z380C	Asus ZenPad Z580CA	Acer Iconia One 8	Linx 810b
Price	£150	£345	£99	£159	£99	£99
Dimensions	221 x 126 x 9.2mm	198 x 134 x 5.6mm	209 x 123 x 8.5mm	203 x 134 x 6.6mm	213 x 127 x 9.5mm	215 x 125 x 8.9mm
Weight	356g	265g	350g	298g	360g	345g
CPU	Nvidia Tegra 2.2GHz	Exynos 5433 octa-core 1.9GHz	Intel Atom x3-C3200 quad-core 1GHz	Intel Atom Z3560 quad-core 1.83GHz	Intel Atom Z3735G quad-core 1.33GHz	Intel Atom Z3735F quad-core 1.33GHz
Memory	2GB	3GB	2GB	2GB	1GB	1GB
Screen Resolution	1920 x 1200	2048 x 1536	1280 x 800	2048 x 1536	1280 x 800	1280 x 800
GeekBench 3 Score	3210	4215	1195	2460	2018	2081

Component Watch

Cut the cord with these wireless keyboard deals...

Using a wired keyboard is fine if you're in front of your desktop PC all the time, but what about if you want to use it on another device, like a tablet or even something less conventional like a console, TV or media PC? In that case, you need a wireless keyboard – and to make sure you get the right one for you, we've been looking at some of the best and most popular models around.

Deal 1: Trust Compact Wireless Deskset

RRP: £24.99 / Deal Price: £11.87

If you'd rather get a wireless mouse and keyboard in one go, then the Trust Compact Wireless Deskset should cater for your needs. As well as the two main peripherals,



it includes the necessary wireless receiver so you can hook it to any PC with a USB port. Despite the name, it's not particularly compact (it's not portable by any stretch), but as a cheap replacement for a wired keyboard, it's a good choice.

Where to get it: Stuff-UK – bit.ly/1IRuUJW

Deal 2: Apple Wireless Keyboard

RRP: £69 / Deal Price: £49.95

Often-imitated but rarely bettered, the Apple Wireless Keyboard sets a certain standard for the market: it has a superb build quality, but it's also rather light on features.



As a basic keyboard, it's expensive, but like most Apple products, its quality makes it worth the money. It's hard to find at a huge discount in most places, but Dabs sells it for a good portion off its RRP, which makes it the best place to buy it from by far.

Where to get it: Dabs – bit.ly/1JQ5gUF

Deal 3: Logitech K750

RRP: £74.99 / Deal Price: £54.99

One of the big problems with wireless keyboards is the battery power they require. The Logitech K750 is solar-powered, chargeable from electric light or sunlight, meaning it's incredibly hard to



drain. A full charge lasts three months in complete darkness! There's also one-touch device switching, so you can connect to multiple systems at once, and it's even environmentally friendly with a PVC construction. An incredible bargain.

Where to get it: Currys – bit.ly/1OTer3E

Deal 4: Microsoft Sculpt Keyboard

RRP: £79.99 / Deal Price: £66.99

Microsoft's Sculpt Keyboard uses a wireless radio connection, so it's not much use on tablets and phones, but it's great for setting up a wireless desktop on



your home computer. Constructed around ergonomic design principles with a wrist rest and a split spacebar that incorporates a backspace function, you'll soon get to grips with this unique and potentially transformative design.

Where to get it: Ebuyer – bit.ly/1NdOQ2N

Deal 5: Logitech K800

RRP: £84.99 / Deal Price: £69.99

If you want a multi-device keyboard that isn't largely dedicated to a slightly gimmicky solar-powered feature, Logitech can also cater for your desires in that regard. The Logitech K800 has the same multi-



device capabilities as the K750, but also a more robust brushed-aluminium finish case and a backlight to help you find the right key even in low light. It's still pretty expensive, but hopefully this deal takes the edge off just enough to make it worth considering.

Where to get it: Argos – bit.ly/1Q2QBnD

The Download Directory

James Hunt scours the internet for the best freeware, shareware and paid-for application releases

This month, the Download Directory's collection of offbeat and largely unexplored applications includes Open Live Writer, a blogging client rescued from extinction by some Microsoft coders; Tabr, a free tab-manager for the Google Chrome web browser; CherryTree, a note-taking application for Windows and Linux, and GlassWire, an application that helps you view what your network connection is doing at any given moment.

Open Live Writer 0.5

Release Type: Freeware

Official Site: openlivewriter.org

If you can remember as far back as the long-forgotten era of 2007, you may recall the release of Windows Live Writer, which was a small text-editing application that interfaced with a huge number of blogging platforms so you could easily create and edit posts. Flash forward a few years to 2012 and blogging had lost its appeal. Microsoft essentially abandoned the project, adding no further updates or improvements.

And so it remained – at least until now. That's because a group of Microsoft coders who loved the software have taken it on themselves to polish and re-release the program as an open-source project called Open Live Writer. Initially released as version 0.5, they plan to update and improve the program over the coming months and years, so this time it remains in active development, available for anyone who wants it.

The basic feature set allows you to create blog posts, add media like photos, videos and maps to them, and then publish them to

your website directly from the application. You don't have to worry about things like the CMS losing your post, because everything is kept locally. Supported platforms include WordPress, Blogger, TypePad, Moveable Type and many other popular platforms too.

At the moment, the project isn't feature-complete, hence the sub-1.0 version number. The most upsetting removal is probably the spellcheck, which had to go because the old version used Microsoft's proprietary version. It's also lost access to the Blog This API, and the OneDrive albums feature is also missing. However, the dev team is working on adding plug-in support, which should allow the open-source community to restore this functionality and more.

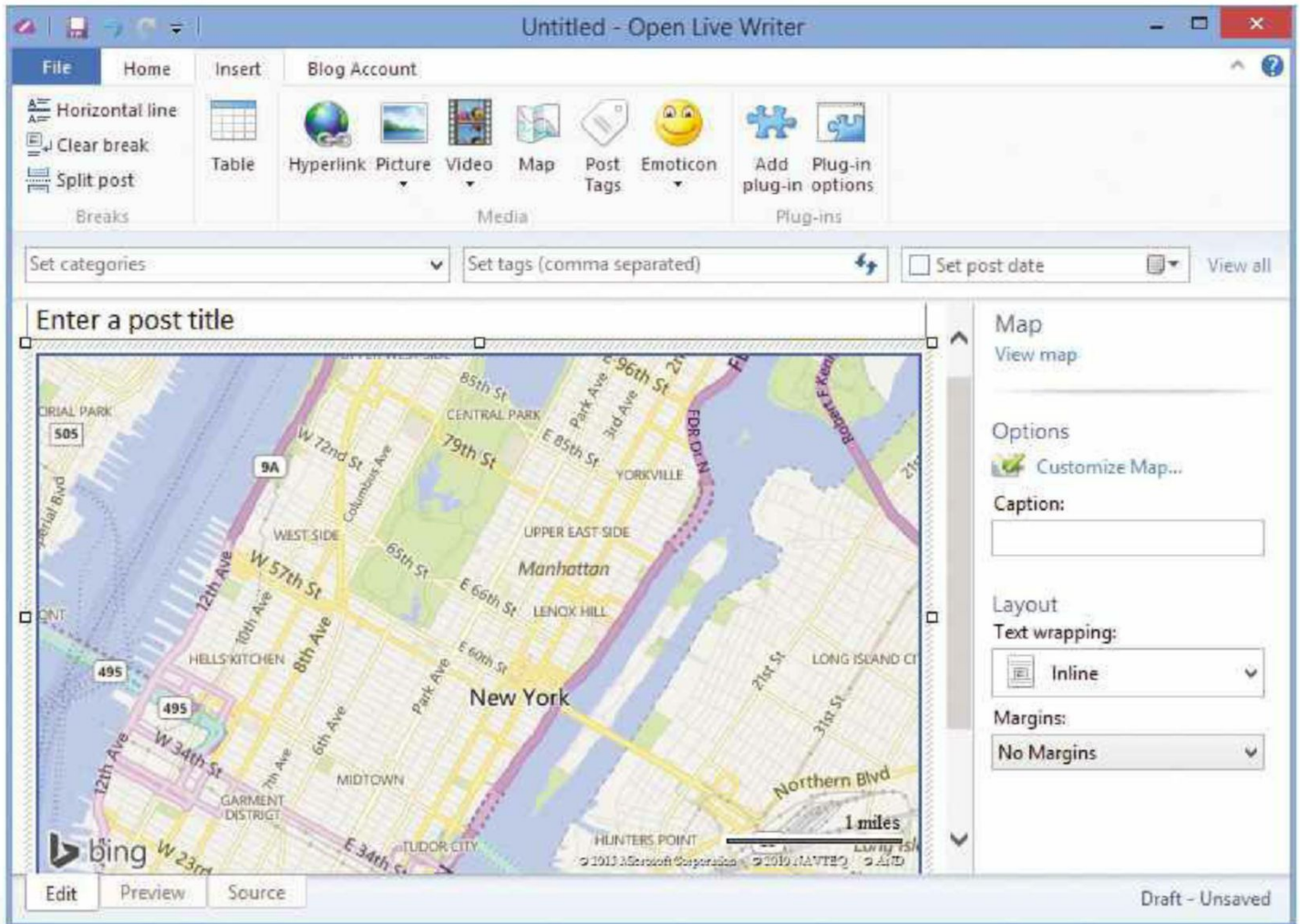
It's fair to say that while the software isn't perfect, it has retained a lot of the slickness of the Windows version, and it seems fairly clear that it's going to improve continually over the next few months after such a high-profile launch. Whether the program actually needs to exist is less certain. If you write a lot of different blogs, we can imagine it as a useful way to centralise the writing process, but if you're just maintaining one, it's not that much better than most blog CMS systems. And let's face it, most people aren't even maintaining one blog these days.

So ultimately it's a mixed bag. The software is mostly good – at least what's left of it – and the promise of future updates makes it reliable enough to be worth investing in. It does do a job that most programs don't, but it seems like a very niche one as well. And it's not like it supports other social media platforms, like Facebook. It's purely a blogging tool. Notionally, we're glad it exists, but we can't deny that we're looking at it as something that's probably good for other people. And if it turns out everyone thinks that, it's not much good to anyone.

Pros: Unique and well-crafted.

Cons: Still lacking some massive features.

Rating: 3/5



Tabr 1.0.3

Release Type: Freeware

Official Site: onlinewolves.com

If you find that you don't have quite enough control over your browser tabs for your liking, a plug-in like Tabr might be exactly what you need. Once installed, Tabr allows you to browse large thumbnails of your open tabs at a single click, meaning if you have a large number open it's a lot easier to see at a glance what you actually need.

When the tabs are active there are plenty of feature-extending functions you can perform in addition to just browsing them. Hovering the mouse cursor over a tab will allow you to switch to it, close it, split it out into a new window entirely or save it in an 'archive' so you can restore it – and any status it might currently have, such as partially filled forms or login sessions – at a later date.

Furthermore, Tabr makes it possible to save the state of every tab simultaneously in the 'archive session' function, which is useful if you want to close down your PC or let someone else use it without having to log out of or close down every site you're currently using. As an added bonus, this allows you to free up RAM, which can be an enormous problem when you're running lots of open tabs on a slow or old machine (and, let's face it, relatively modern ones too).

Tabr also has the ability to manage your tabs without your intervention. If you want, you can set tabs to auto-archive once they've been idle for a set number of minutes. It's useful for keeping your system stable if you step away from it for a while, though it certainly has the potential to confuse anyone who isn't paying a lot of attention.

For the most part, Tabr is easy to use, and while there's not a whole

lot to the program once you actually start using it, there's also very little to criticise. If anything, we'd like to see a few more features, such as quick-restore, auto-save for forms and the ability to group tabs together so it's easier to split them into a new window, but what it does already is fine. Certainly, there's no doubt that it improves Chrome overall, even if we'd stop short of saying the features are essential.

Our only big complaint? That it's not available for any other browsers. We can understand it not existing for Internet Explorer or Edge, but no Firefox version? That's a lot harder to forgive. Unfortunately, the developer seem committed to Chrome rather than Mozilla extensions, so that seems unlikely. But if you're using Chrome already, it's definitely worth a try.

Pros: Intelligent tab management that goes well beyond most browsers

Cons: A few more features would certainly not go amiss.

Rating: 4/5

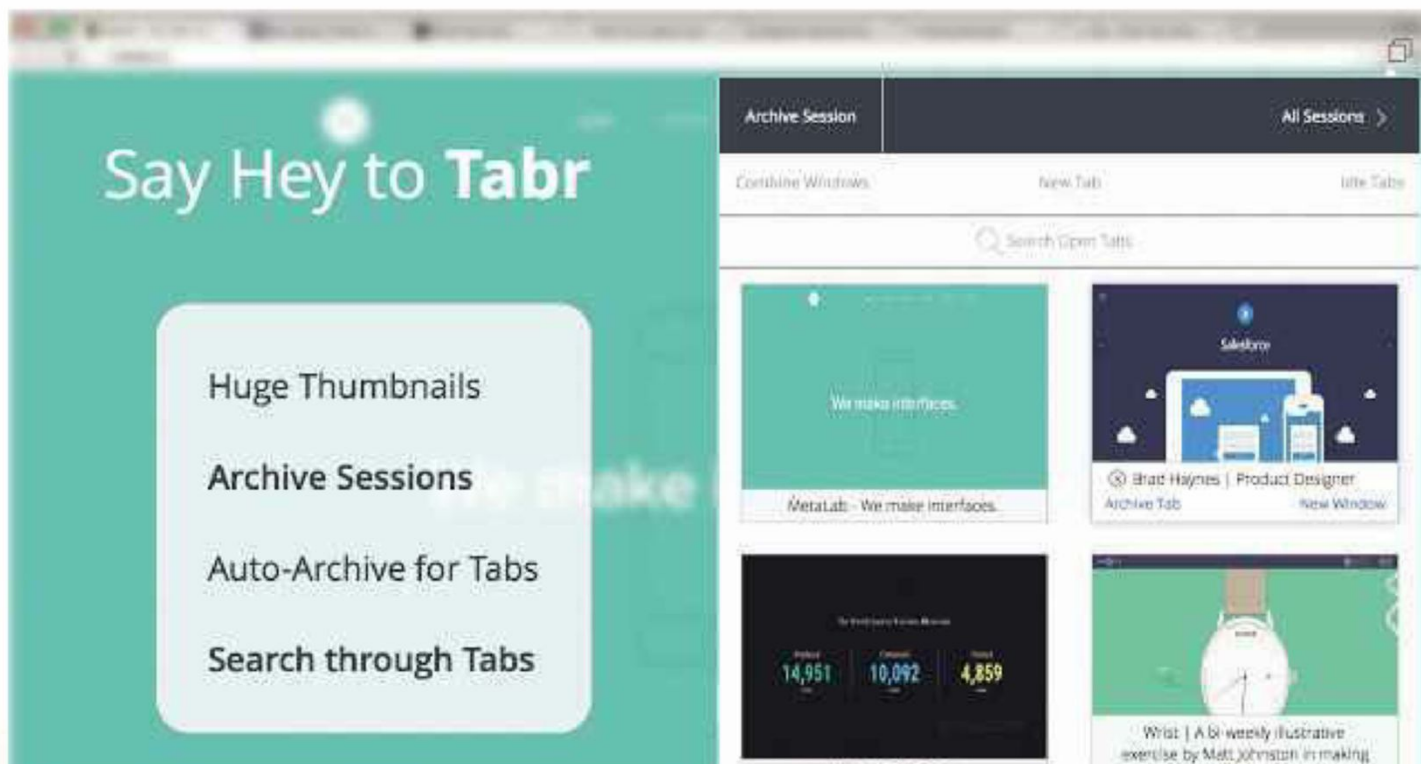
CherryTree 0.36.1

Release Type: Freeware

Official Site: www.giuspen.com

CherryTree is a note-taking application for Linux and Windows, which helps you organise your thoughts hierarchically and logically. More than just a to-do list creator, the software can also help you with tasks like brainstorming, planning and outlining thanks to its node-based structure.

It sits in the same realm as other similar programs, encouraging you to create a tree of linked ideas and sub-ideas. Each of these notes has



its own page that you can work on, adding thoughts and tasks, and even more complicated forms of information like links, images, tables, files and more.

The interface offers the standard array of formatting options, and the core editor has a spell check and syntax highlighting for a variety of popular coding languages. Virtually every combination of two keys allows you to shortcut your way to an option, so if you become proficient in the software you'll be able to zip your way around in no time. No need to touch a mouse.

If your projects get particularly complicated, there's a very good search tool (with regular expression support, naturally), so finding what you're looking for should be quick and easy. If something's particularly worth remembering, it's possible to bookmark nodes as well so you can switch to them almost instantly and at a glance.

Save files can be exported as a number of popular cross-compatible formats, including PDF, HTML, plain text, XML and SQLite. It's even possible to password protect the saves (where supported) if the data is potentially sensitive. Files can be opened with other similar applications like KeepNote, Mepad, Zim, Gnote and more. It's clear that a lot of care has gone into producing this software at just about every level.

Admittedly, its over-stuffed menus and somewhat unfamiliar structure are likely to put off a lot of people before they ever get started, but if you're used to this sort of note-taking, it isn't likely to disappoint.

The fact that it's completely free and inter-operational with other software in its field means it's likely to attract interest from within its niche, but ultimately the thing that makes it good also holds it back from being likely to attract a wider audience. We can't see anyone making this their first port of call if they're new to the field, though – ultimately, it's just not doing enough to distinguish itself. Maybe when the program is more complete, that'll change. We'll come back and look at it then.

Pros: Wide cross-application functionality makes it easy to pick up...

Cons: ...but mostly for people who've already used this type of program before.

Rating: 4/5

Betawatch

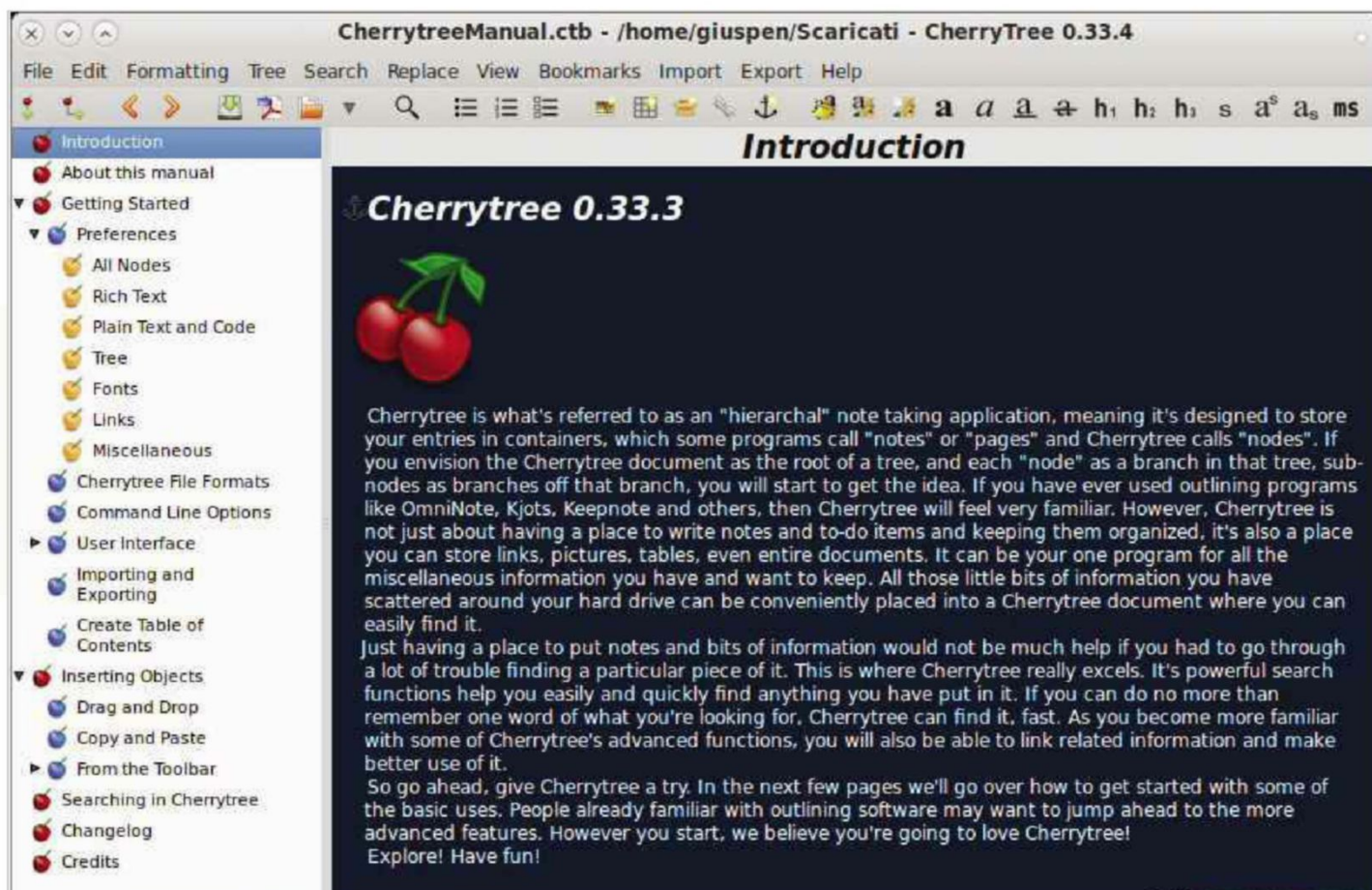
To help you stay on the bleeding edge of software releases, Betawatch is a guide to the experimental and unfinished versions of some of the most popular applications around. Can't wait for new features? Now you don't have to!

AMD Radeon Software Crimson Edition 15.30.1025.1001 Beta goo.gl/tY2Ff2

AMD has released a new edition of its drivers, and it's a complete overhaul that it's calling the 'Crimson Edition'. This beta version gives you the chance to see a completely new interface for your Radeon card's configuration options, and works on integrated AMD GPUs as well.

It's worth noting that this isn't likely to affect performance more than any average update, but it should give you easier access to the options that might. AMD is keen to point out that it can't be used on versions of Windows earlier than Windows 7 SP1 that you need administrator rights to install it, and that it cannot support AMD products running on an Apple Boot Camp platform.

As well as the all-new settings interface, new driver features include a new shorter installation process, full support for Liquid VR-compatible devices, Asynchronous pixel shaders on the PC and a new shader cache, support for custom resolutions, better frame-rate target controls, directional scaling for 4K screens, DisplayPort to HDMI 2.0 support, and as well as all that, improvements in support for a good chunk of recent games, including *Fallout 4*, *Star Wars Battlefront*, *Call of Duty: Black Ops 3*, *Just Cause 3* and far more else that we don't have room for here. Certainly, if you're running a Radeon system, we recommend you try these drivers out.



ReDownloaded

This month, in our regular retrospective section, we're looking back at the December 2013 instalment of Download Directory to see how the programs we reviewed have fared. Are they better? Worse? Gone completely? Here, we find out.

Zattoo

zattoo.com/gb

Reviewed Version: 5.0.1, Current Version: 5.0.1 (sort of)

Zattoo is (or, we suppose, was) a desktop-based IPTV viewer that allowed you access to various free online TV streams, but with the bizarre convention of making you view adverts every time you wanted to change channel. These days the software is still around, but mainly as a mobile application for the likes of iOS and Android. If you dig around, the desktop version is still there, but it's no longer supported, in favour of newer versions. It was never great, though, and continues in that vein.

Artweaver

www.artweaver.de/en

Reviewed Version: 4.5, Current Version: 5.1.1

When we looked at it a couple of years ago, Artweaver was an impressive tool occupying the complexity space between MS Paint and Photoshop, and although it was paid-for, it was still better than the competition. These days, it's still good, and the price hasn't gone up at all, but it is harder to recommend, given the leaps and bounds with which rival Paint.net has come on. It's recently repositioned itself as a

tool for digital painting and proper artistry, so perhaps that's its way of competing. Still worth a look, either way.

SecPod Saner Personal

www.secpod.com

Reviewed Version: 1.0, Current Version: 1.4

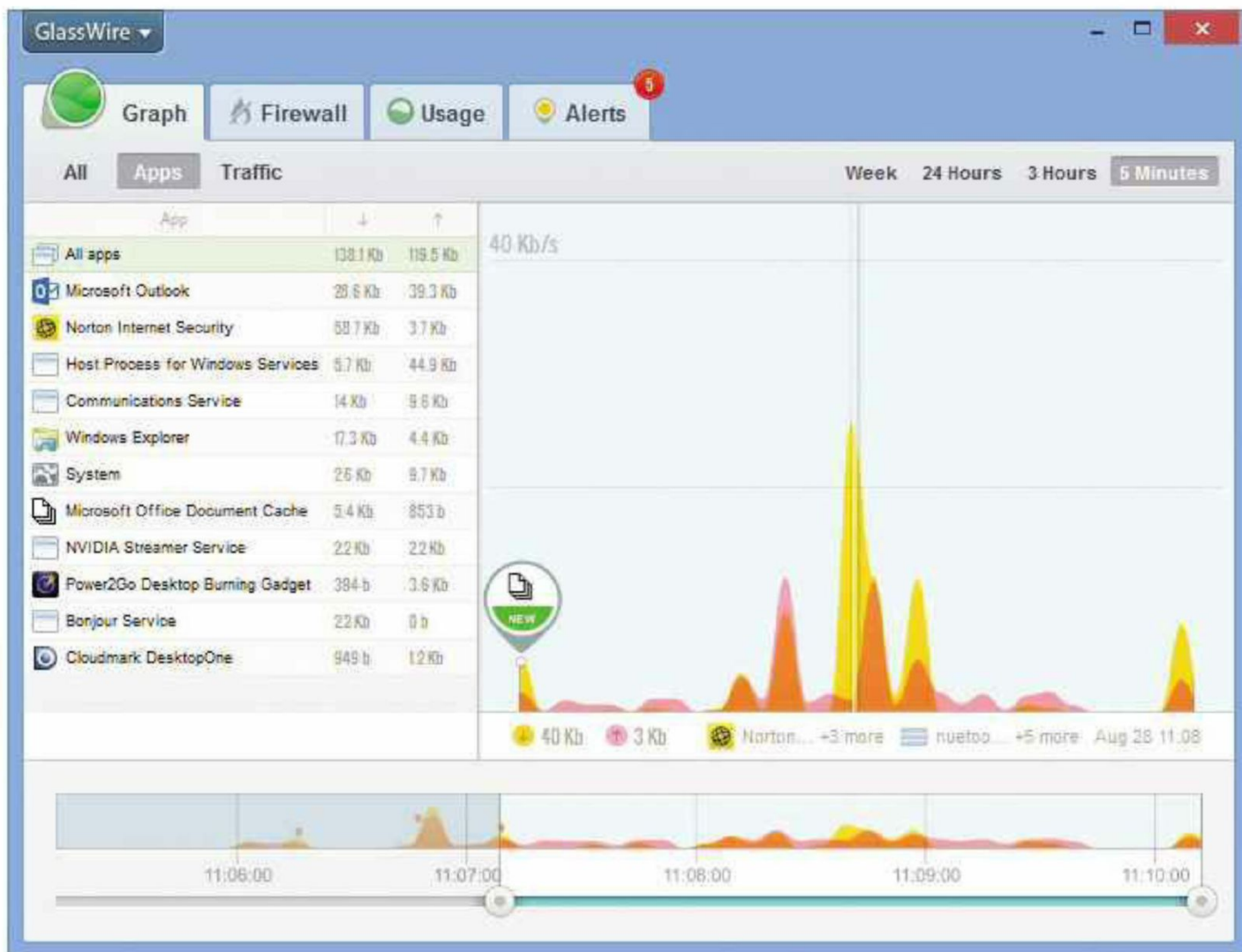
This oddly named program is in a familiar category (it scans for and applies application updates), although at the time we last reviewed it, things were a little rough around the edges. It's come on a bit recently, fixing some of the strange language and functionality problems we had, but ultimately that's not really enough to make it stand out against the other options there are in the field. We're not sure it's moved on enough after two years to recommend getting it now, though. It's still some way off reaching its potential, and at this pace, by the time it's ready, we suspect Windows won't need it.

SKTimeStamp

stefanstools.sourceforge.net

Reviewed Version: 1.3.4, Current Version: 1.3.4

When we first checked out this applet for modifying the time stamps on Windows files from within Explorer, we said it was basically perfect. For that reason, we can't get too upset that it hasn't actually changed since then, because it still works and it's still basically perfect. Unless and until Windows goes through some major changes, this program will keep doing its job, and the fact that it doesn't need more features is evidence of its simplicity, rather than a failure of imagination on the part of the programmer.



GlassWire 1.1.36b

Release Type: Freeware

Official Site: www.glasswire.com

The built-in Windows network monitor is one of the operating system's many system-level tools, which accomplishes the bare minimum to qualify for the name, and it certainly doesn't do enough to be actively useful. That means if you want to monitor your network traffic, a program like GlassWire should be exactly what you need.

What makes GlassWire instantly stand out from the competition is that even at first glance, you can appreciate how attractive it is. The window updates are smooth and flowing, so you can get a definite sense of how performance changes moment to moment when compared to the jerky, stuttering updates most monitoring programs offer.

The traffic graph also does its best to dispense with the sort of detail that the average user isn't likely to care about. It overlays your download and upload graphs onto undulating chart, but further breakdowns are absent. If you're techy enough to care whether traffic is UDP or TCP, or you like charts of rapidly changing, impossible-to-follow numbers, then there are plenty of programs that do this already. This one is aimed at people who just want to see how their connection is performing.

That doesn't mean there's no information available, though. It's possible to break down the chart by application, so you can see

which program is using your network connection, and clicking on the graph allows you to see the time and date of any point on it. It'll even show you what resource the program was trying to get hold of, which makes it an excellent diagnostic tool if you're wondering whether there's malware on your system.

The graph defaults to the last five minutes, but you can extend it to show data from the last three hours, 24 hours or even the last full week of activity. You can scroll back and forth through the recorded data regardless of your zoom level, so the backlog becomes useful in ascertaining whether your connection has got better or worse over time.

Additional tabs give you a more analytical look at the data, with the usage tabs showing you which apps are the most data hungry and the firewall tab telling you where your traffic is coming from and going to, and it allows you to block a connection at a single click.

While it's true that GlassWire might put off some more technically minded users, we think the vast majority of people who try it will find it intuitive and simple to understand, and that's exactly what we like to see in an application. This puts surprisingly powerful network monitoring in the hands of even the most novice user, and that makes it the gold standard.

Pros: Good to look at, easy to use, zero complications

Cons: Maybe a little simple for power users. Maybe.

Rating: 5/5 mm

Remembering... Type-in Program Listings

David Hayward has a try at entering hundreds of lines of BASIC again

Type-in programs, as found in the many magazines of the late 70s and early 80s, were once the only source – other than books loaned out from the local library – of technical programming resources we could get our hands on.

We're willing to bet that many of you reading this spent many an hour in front of a burning hot ZX81, Spectrum, BBC Micro or Commodore with a magazine opened up on the BASIC or machine code listing, squinting from one to the other in an effort to type it all out with as few mistakes as possible.

Of course, the old computing joke is that once you'd spent several hours typing it in and once you'd entered Run, the program usually returned with something like 'Stop – Error on line 4097'. To those who knew what they were doing, a quick look at the line and a change in variable or something would fix the problem. Those who were typing it in for a free game usually ended up deleting the line and hoping for the best.

For us the type-in program listing was a learning experience. It taught us BASIC the Spectrum manual, as well as how to animate a sprite across the screen, change the colours of a backdrop, present something in an isometric view and how to get some great sound effects and title music from our limited machines.

With the help of the type-in program listing we evolved from using BASIC, moving on to assembly and other forms of

machine code and higher level computer languages. It fed our imaginations and we could expand on the listings to make our own mark on them.

Its History

The type-in program listing can be traced as far back as the early 70s, with the publishing of the book *101 BASIC Computer Games* by David Ahl.

According to Ahl, he put out a call for game code and was inundated with reams of listings from academics across the US. Obviously, the trend caught on and as the rise of the home computer, then in kit form still, started to take hold more, and more users wanted something to actually do with their machines after sweating over a soldering iron building them.

Later, the computer magazines of the time started to print listings sent in by readers. C&VG, Sinclair User, Micro Adventurer and Personal Computer Weekly all contributed to the type-in program listing, with page on page of printed BASIC games, routines and tools.

As time moved on, BASIC listings began to fade out in favour of lengthy lists of assembly, which proved to be quite a challenge to both test, print and eventually read.

Over time, though, the 8-bit home computer gave way to the 16-bit machines and consoles, which in turn phased out the type-in program listing and limited it

Did You Know?

- C&VG started type-in listings in the November issue in 1981, the first issue.
- Sinclair User's type-in listings ran from April 1982 through to April 1993.
- The magazine staff would often stay up most of the night entering the list for printing and testing, only to have the machine fail and lose everything before saving it.

to just a few exclusive magazines. As with most print, in time the internet did away with the need to type in a listing.

The Good

A free game, a great learning resource and a unique interaction with your favourite magazine.

The Bad

Listings could be riddled with errors, badly printed text could make it impossible to read, and some of them were simply too long to tackle.

Conclusion

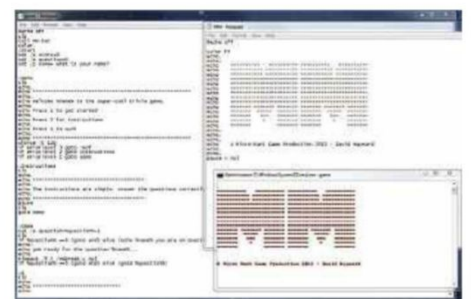
Farewell type-in program listings; we were both thrilled and frustrated by you, but we did love seeing you in the pages of our favourite magazines.



▲ The first listing from C&VG, from 1981, for the Nascom 2



▲ Type-in program listings were a great way to learn how to program



▲ We even managed one or two listings in recent years

RETRO ROUND-UP

Dave Edwards rounds off the year in style with a countdown of this year's best releases, a look at new games for the Nintendo and Spectrum and an announcement that heralds a new first port of call for any game you might care to name...

Merry Christmas everyone! We're at the end of 2015, and I've reported on hundreds of new retro games over the past year. I'm starting this month with a countdown of my personal favourites of those we've covered, in ascending order of preference, with a few notes of exactly what makes each game great (check your back issues for more!). The number one spot goes to the retro game I've played the most this year; the difference between the others is marginal at best.

10. Invasion Of The Zombie Monsters (Relevo, Amstrad/Spectrum 48K/128K/MSX)

With an impressive array of developers and testers, *Invasion* is a fully featured platformer with animated cut-scenes galore.

9. R-Type 128 (Easter Egg, Amstrad CPC)

The Amstrad received a souped-up Spectrum version of *R-Type* back in 1984, even though the machine was capable of a lot more. Easter Egg redressed the balance with *R-Type 128*.

8. Egghead Round The Med (Cronosoft, Spectrum 128K/ZX Vega)

The fifth outing for Cronosoft's Egghead isn't just a platform game; it's five of them, reached by navigating Egghead's boat to each themed destination. An astounding game.

7. Quantum Gardening (Cronosoft, Spectrum 48K/ZX Vega)

Quantum Gardening brings something absolutely new to the table; make sure you read the instructions before attempting it (which might be difficult on the Vega, seeing as it doesn't include any!)

6. El Stompo (Monument Microgames, Spectrum 48K/ZX Vega)

A platform game released shortly after Einar Saukas's wonderful fix for the Spectrum attribute clash, *El Stompo* takes advantage of the increased colour palette for a wonderfully wacky cartoon adventure.

5. Love Story From Titanic (Fun Forge, Spectrum 128K)

Take control of Leo and guide Kate into his arms by bashing colourful blocks to pieces, all set to bouncy reworkings of the soundtrack from the movie *Titanic*. A brilliant game, it's spoiled by a full title (Google it!) that would lead you to believe it might hold a nasty surprise. It doesn't.

4. Daffy Duck (Hi-Tec, Commodore 64/128)

With a backstory as intriguing as the game itself, the newly rediscovered *Daffy Duck* was bound to make this list. A great little platformer, if a little repetitive in places, we saluted the boys at Games That Weren't for finally giving this the release it so obviously deserved for the past three decades.

3. Rocket Smash Ex (Psytronik, Commodore 64/128)

Rocket Smash Ex begins by roaring "Get Ready" and then launches into the definitive version of *Jet Pac* which, if you've never played it, was one of the classic Spectrum 16K titles of 1983. Almost compulsively playable, this game is worth every penny of its £3.99 price.

2. Splattr (Cronosoft, Spectrum 128K/ZX Vega)

A game almost impossible to describe in words and which looks terrible in paused screenshots, Bob Smith's excellent *Splattr* defies almost every Spectrum convention there is. Totally superb.

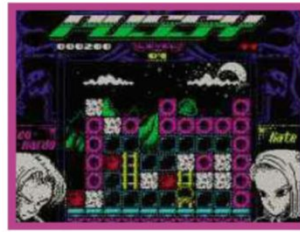
1. Pixel Quest (Einar Saukas, Spectrum 48K/128K)

And the number one spot goes to *Pixel Quest*, which invites you to patiently plot the CHR\$ definitions of games of old cross-stitch style until you have successfully turned every vertical and horizontal number combination from yellow to blue. In any other puzzle game, the thumping bass in your ears would be distracting, yet here it seems to complement everything perfectly. Yes, I've already lost hours of my life to the other games on this list, but to this one you can make that days!

Chrimblast (Spectrum 48K, tinyurl.com/qj6tzap)

Chrimblast is a Christmassy shoot-'em-up game, which happily reunites us with the





R-Type style gun. That's the one where a quick press on the fire button gives a short burst of gunfire but holding it down releases something that obliterates everything in its path. The game starts with sampled speech booming 'Chrimblast' and has a Yerzmyey soundtrack too.

The aim is to complete eight missions, and the objective of each is to collect nine seasonal objects (i.e. presents, puddings, fruits, etc). These bob about in space, casually floating left and right as they descend towards your scout-ship, which you can attempt to position so it's ready to collect them.

Making this a bit tougher are the aliens who come streaming down the screen and must be either avoided or blasted with one of your two weapons. Unfortunately, your bullets will destroy the collectables as well as the aliens. You therefore need to try to position your craft in such a way that you don't accidentally shoot the collectables.

There is some skill involved in this but not a great deal of it. Chrimblast gives you an insanely large amount of lives (Nine!) and does not penalise you even for blasting the seasonal items, hence its first few missions feel rather unchallenging, and it's tedious to work through them more than once.

If you persevere, the missions do get tougher, and you come under attack from more aliens at once, with penalties for shooting seasonal objects being introduced too. From a very impressive intro, however, it's odd that the game feels so undemanding; with the excessive lives, most players would be able to complete all eight missions on their first go! Three lives would have been quite adequate to inject a bit of a challenge to Chrimblast.

Nevertheless, if you're in the mood for some mindless, forgiving blasting fun, then Chrimblast will certainly fit the bill.

Alter Ego (Spectrum 48K/128K/+2, Nintendo NES, tinyurl.com/ocglj8y)

It's not often that a game appears almost simultaneously on two formats as different as the Spectrum and the NES. The systems are worlds apart in terms of capability.

It's even rarer when that game seems to have been released specifically, with a poetic nod to its subject matter, for those two particular consoles on purpose.

The game in question is *Alter Ego* from RetroSouls, in which the central premise is 'mirrored' reality. If you know your retro computer history, you'll be aware that 30 years ago, the mirrored computer reality was the British with their hands full of Spectrums and the Americans busy with their Nintendos. I'm bowled over by RetroSouls' marketing nous to echo its game concept with the history of the consoles in that sort of way. This is, however, what it's done.

And on top of that, this two-man team (Richard Armijo on NES; Denis Grachev on Speccy) have created an amazing platformer/puzzler too. At first glance, a typical ladders and levels game, its short instructions reveal only that you will be accompanied throughout your quest by a mysterious, ghostly alter-ego. Your quest is simply to collect all the jellies from each screen, but as soon as you start to move, you'll see him: a spooky see-through half-man that glides through the scenery either horizontally or vertically, echoing every move you make.

He isn't actually your problem. The demon skulls that pace the platforms of each level, the bridges that collapse beneath your feet and the puzzles that will have you tearing out your own hair in frustration are *Alter Ego's* big headaches. The ghostly figure is in fact your key to outwitting each of them. By a tap of the 'Switch' key, you and your alter ego switch places, which essentially means that instead

Alter Ego (Nintendo/Spectrum 48K)

Graphics 8
Atmosphere 10
Presentation 9
Overall 9

Chrimblast

Graphics 7
Atmosphere 6
Presentation 7
Overall 7

Land Of Mire Mare

Graphics 6
Atmosphere 4
Presentation 10
Value for Money 3
Overall 5

of the usual 'jump' key, you can transport to another area of the screen.

That's *Alter Ego*, exactly the same game on each format, with exactly the same layout of screens. You must run left and right, and climb and descend the ladders, avoiding anything that moves. If you're in danger, you need to position yourself ready to use one of your limited 'switches'. You and your alter ego then whizz across the screen to change places. You can even do this while falling or climbing ladders. The number of 'switches' you can make changes each screen, and screens do not scroll; what you see is the puzzle you need to solve – and sometimes you don't need to 'switch' at all! A cunning inclusion, that.

Having played both versions, the Nintendo version slightly has the edge over the Spectrum one, with a larger number of tunes, more beautiful sprites and some nice 'Level Clear!' and 'Game Over' Americanisms that RetroSouls decided us Brits didn't need.





▲ The loader screen reminds you it's Christmas!

Both of them do also suffer the same irks, though. The first is that the ghostly alter ego and the boy you control are actually pretty similar-looking. It's easy to confuse the two and, instead of running the right way, end up running the wrong way as the 'other' character...

Alter Ego is also very difficult: it has 25 levels but I can't get further than level 10 due to the perfect timing involved in outwitting some of the adversaries.

As *Alter Ego* came out at the beginning of the year, the ZX Vega also already includes the Spectrum version – so if you get one of those in your Xmas stocking this year, you can play this game (and, incidentally, some of those featured in the Top 10) instantly!

Mire Mare (Spectrum 48K, tinyurl.com/zaqnuh9)

The saga of *Mire Mare* is well-known in the retro computing world. The very short version of it is that Ultimate began work on it but never finished it, leaving all those who enjoyed Ultimate's other 8-bit offerings (*Alien-8*, *Sabre Wulf*, etc.) to wonder what might have been. The longer version you can read on Wikipedia at en.wikipedia.org/wiki/Mire_Mare.

What we have here is not Ultimate's 'lost' *Mire Mare*; instead, it's a wholly new game,



▲ Each mission requires nine collectables to be retrieved

which its publisher, AGD Homebrew Games, calls a tribute to that unreleased title. The physical release comes in an oversized black slip-case box in identical style to Ultimate's classic releases, and the cover art and instruction manual are all lovingly done in the Ultimate style.

The game itself is an overhead maze game which, while nicely presented, is something of a mishmash of gaming oddities. You control Sabreman (star of *Sabre Wulf*), and your mission is to collect three magical jewels and throw them into the Well of Mire Mare. Strangely, you cannot pick up the jewels directly if you find them; instead you must be carrying the 'pledge' (a random object found in the maze itself) appropriate to that jewel. If so, moving over the jewel will swap the two of them.

You move around the various locations by going in and out of doors, which flicks the screen to the next location. Usually, you have a few seconds of breathing space before enemies begin to teleport in. You don't have any sort of weapon when you start, so you have to defeat them (initially at least) by beating a hasty retreat to 'flick-screen' them away!

Even alone, this feature feels like it's breaking half a dozen gaming rules, but

it's nothing compared to the flashing mushrooms that are scattered throughout the locations and have a 70% chance of killing you – except on the rare occasion when they will boost your energy instead. Naturally, against those odds, you practically need to be at death's door to consider taking the risk.

Cast your mind back to those enemies mentioned earlier. In fact, these enemies number ghosts, soldiers, fires and gas bubbles. None of the weapons you can find (an axe, a staff and a sword) fire bullets, meaning that the only way you can test whether any weapon defeats any enemy is by barging into it and hoping that this won't see your energy wiped out in a fraction of a second.

Why the axe defeats the fire or the staff defeats bubbles is beyond me.

Now, perhaps AGD included all of the above 'features', because they were mentioned in whatever surviving documentation exists about the *Mire Mare Ultimate* release. I don't know enough about that to comment. What I do know is that they do not hang together well in this tribute; more often than not, my jaunts into *Land Of Mire Mare* found me backed up against a dead end while enemies 'hovered' over me until my energy was wiped out.

On that basis alone, I would have trouble recommending you play it. And with all the bizarre fighting weapons, 'pledge' items and random death features, it becomes yet more exasperating.

If you can imagine this game on release without the *Mire Mare* connection, I would be summing up that it was a difficult, colourful, frustrating graphic adventure that doesn't really offer much more than a hundred others.

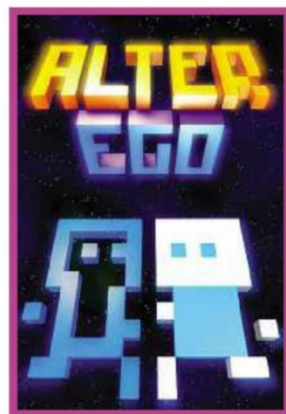
This being the case, the Ultimate association suddenly becomes a rod for its own back. Clearly, it's an interesting idea to try to 'deliver'



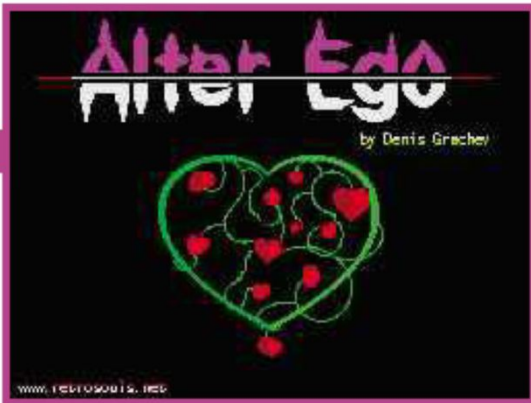
▲ A simple title screen hides this treasure



▲ Halfway up a ladder, deciding what to do...



▲ Alter Ego: Who is the monster and who is the man?



▲ The game comes from the new publisher RetroSouls



▲ Two switches left. Make them count



▲ The reflected alter ego on the Spectrum inlay folds around the cassette tape

a game that enthusiasts have always wanted; the splendid packaging is an obvious plus, and the game itself is put together well. In all fairness too, I have to point out that you can download it for free; the £24.95 price is only for a physical cassette version.

And yet I do still have enormous difficulty with the amount that *Land Of Mire Mare* is being sold at. It's so high that it leaves AGD open to allegations that this is not so much a tribute as an attempt to cash in. The game itself is created with Jonathan Cauldwell's Arcade Game Designer utility, so many elements of it are generic. So if you do scout out a physical version, you're paying £25 for a cassette, a black box, some glossy paper and what I assume to be less programming work than has been put into the average Cronosoft title. And to give a more concrete illustration, the same price will buy you six Cronosoft Spectrum games.

Often I can see the sense in collecting up the physical versions, as the limited number of them produced means they increase in value very quickly. However, I seriously doubt whether *Land Of Mire Mare* will ever sell for more than £24.95, so much better to download it instead.

Every Game Going – Live At Last!

I'm happy to end this column – the last one of 2015! – with an exciting announcement. Since starting to write for Micro Mart, one of the problems I have faced is that of providing reliable web links for you all. By the time the magazine is a few weeks old, the link I have given has ceased to work. For all the downloads featured, there has not been a 'focal point' (something like the Apple Store or YouTube), with the cover art, screenshots and links to information about each game featured. Obviously, it's not my fault. It happens because:

a) Some games are only produced in limited number. They sell out, and the publisher takes the page about them down (e.g. Cronosoft, Monument Microgames).

b) Some games are only available on forum threads, so if the site closes down, all of that software disappears forever (e.g. Retro Software, World Of Spectrum).

c) Some publishers have terrible web sites (e.g. Cronosoft).

d) Some publishers only buy a single web domain for a year, and then forget to renew it, either ceasing to sell the game or selling it somewhere else.

e) Some games are hidden in really obscure places (e.g. cross-domain links on indieretronews.com), and then the developer changes the filename on his own domain.

f) Some games are in English, but are hidden away on Spanish or Russian sites, and it can be extremely difficult to pick out the download you need, meaning you have to follow complicated instructions (which I don't have space to give) to even get it.

I therefore present to you (drum roll please) www.everygamegoing.com – or EGG for short – a site which at one fell swoop brings a bit of order to this temperamental world. One page for every game ever released for any machine on any format, complete with all the information you need to find them, buy them and play them. It has links to legal downloads too.

On it, you'll find every game I've ever reviewed in Micro Mart and, from this column onwards, you'll just get a single tinyurl link to the game's page rather than the plethora of links to YouTube videos or forum posts featured previously. This will free up more space for more reviews in future columns, which is great.

You might find EGG is a bit basic for the time being (basically, all you can do is search on it), but I'm sure you will agree it's a lot better to have a single place where you can simply enter the name of any retro game I've featured and not be faced with a 404 error before the week's even out! It has instructions for how to play all the ZX Vega games on it too, so if you're stuck for how to play any of them, consider it my Christmas present to you... Don't worry, it will grow with the next few columns.

Roll on a retro-gaming New Year...! **mm**



▲ One of the jewels in the 'dark mountains caves'



▲ A moment of peace in a hectic world



▲ The Ultimate-inspired cover art



◀ *The UbiSurfer:
no net result*

Scrap Or Salvage?

Are we too eager to write off seemingly broken kit?

Roger Thomas has been doing some creative upcycling

Giving away unwanted but functional tech is good, and we know it. So is recycling, such as sending a dead phone off in one of those prepaid envelopes so that valuable materials can be recovered from it.

Recycling, however, has its limits. One disadvantage is that recycled materials are usually 'downcycled' into something simpler or of lower quality. The metals and plastics from old phones are really no more than that until they get used to make a new product. Recycled paper is widely used, but its fibres are much shorter, so it needs to be mixed with fresh material. All these considerations bring their own costs, both financial and environmental. There is, however, a third possibility.

Uphill? No Struggle

'Upcycling' isn't a strenuous new Olympic sport but a philosophy that entails reusing goods and materials, which may no longer serve their original purpose but which can nevertheless be used for something else exactly as they are, without expending time and resources on dismantling them or reducing them to raw materials.

The term was first used in the 1990s, but as an idea it's been around forever, and it's something we all do to an extent. An empty marmalade jar, for example, has lost its intended function as it can no longer furnish me with a ready supply of marmalade. I can't reuse it as a marmalade jar, because I don't make my own. I could lob it into the relevant recycling bin and allow it to be turned into aggregate or glass-fibre insulation, but that would be an industrial process like any other, consuming energy and creating a certain amount of pollution. Furthermore, unlike conventional manufacturing, it would produce a material that was much cruder than the object I started with.

On the other hand, what if I simply wash it and use it for storing pencils? It now has a very different long-term function, arrived at non-destructively and with minimum energy use. What's more, when it eventually fails in its new purpose as well (i.e. when I drop it and break it), it can have a third life as a true recyclable if I chuck the bits into my local bottle bank.

Tech Tonic

We're less inclined to think of computers and related technology as being upcyclable because such items generally have a primary function, key selling point or unique feature that defines their intended use. If we buy a mobile phone, for example, whatever else it may be capable of, we expect it to handle voice calls and texts. We assume that speakers will speak and that monitors will, er, monitor, and quite right too. If any such gadgetry stops doing what it's supposed to do, then if it's beyond economical repair (an increasingly likely conclusion, sadly), we generally dispose of it – hopefully via a recycling facility – and obtain a replacement.

All that said, there can be another way of doing things. You're about to read three unlikely-sounding case studies in computer upcycling, involving a cheap netbook that won't actually connect to any kind of network, a touchscreen tablet with a non-functioning touchscreen and an aging laptop

Alternatively...

I've majored on certain upcycling goals purely because they happen to be of interest to me; when it comes to your own preferences, you can do the same. The UbiSurfer would also work as a digital photo album, a child-amuser (it has a version of Paint and a few basic games, the quaint retro style of which is entertaining in itself) or a generic ebook reader if you were happy to download your titles onto another device and move them over. The tablet would of course do anything any other Android device could do, provided you were happy to steer it via USB; keeping it as a dedicated Google Play viewer is just one possibility.

that has had its hard drive removed, leaving just an empty caddy. Without any dismantling, repairs, replacement parts or modifications, we're going to make all three of these casualties do useful things.

Trash Trawl

The netbook is a primitive UbiSurfer model dating from around 2010, and even when it was working properly, describing this device as 'bog-standard' would do the average bog a disservice. Running at all of 346MHz and embedded with Windows CE 6.00, its main purpose was to provide cheap access to the internet via either a wireless LAN (there's no Ethernet socket and it can't see a USB/RJ45 adapter) or manufacturer Datawind's own mobile system. Unfortunately, neither option now works, and Datawind no longer supports the thing anyway.

“ The term was first used in the 1990s, but as an idea it's been around forever ”

I have more affection for the second item, which is an Archos 101 G9 tablet. Although its OS won't update beyond Android 4.0, its large screen and 1GHz dual-core processor serve my needs nicely, notably reading online journals and magazines. Sadly, it appears (watch what I did there) to have developed the digital equivalent of locked-in syndrome in the form of an unresponsive touchscreen; it boots up, but attempting to unlock it just leaves you pawing at the padlock icon in desperation.

The third and final specimen is an ex-corporate Dell Latitude laptop, seemingly signed out to an under-performing employee, as it shows virtually no signs of wear despite being ten years old. With its dual-core 1.83GHz processor and upgraded 2GB of RAM, it would have been useful enough during its heyday. At some point, unfortunately, whether for reasons of security, malfunction or cannibalisation, its hard drive was removed; booting it up simply leaves it pleading for a system disc. I don't have a spare HDD that's big enough to be worth installing, but I don't want to buy a used one as I'm convinced that today's larger drives have a shorter working life than their smaller predecessors. I can't justify the cost of a new one, as I don't really need the machine anyway, but at the same time I don't want to give it away incomplete. Quandary.



▲ Room 101 for an untouchable G9?



▲ *Play the Bluvs with a Mini Mixer*

All in all, then, we've got a fine collection of chocolate teapots: a netbook that isn't, an untouchable tablet and a laptop that can't even store its own operating system, let alone anything else. Is it really possible to find constructive uses for this stuff?

Lateral Thinking

The trick to upcycling is not to worry about what something can't do, but to focus on what it can do. That marmalade jar may now be devoid of marmalade, but it's still a functional transparent container. Yes, welcome to the University of the Bleedin' Obvious, but apply this principle to this heap of dodgy kit and the concept becomes rather interesting.

“ Describing this device as ‘bog-standard’ would do the average bog a disservice ”

Let's check out this netbook. While its networking capabilities have ceased to be, it still has its rudimentary but functional pre-installed SoftMaker Office software. This comprises a word processor, spreadsheet and PowerPoint clone, all of which are compatible with MS Office, which actually bodes fairly well; while I wouldn't trust the presentation program purely because different versions of PowerPoint have enough trouble understanding each other as it is, the suite can at least see and create files such as .doc and .docx. There are plenty of shortcomings in comparison with a serious office suite, such as the laughably tiny font set, but as the unit's 'My Computer' icon is actually an image of an old-school PDA, it seems churlish to be too choosy. The fact is that it would be perfectly possible to transfer documents between this machine and a 'proper' computer and work on them in either environment, which brings us to the UbiSurfer's USB ports.

There are two USB sockets, but class compliance means nothing to CE, so it's no surprise that these two sockets are only intended for external keyboards, pointing devices and storage media. Nevertheless, this is all we need to upcycle the UbiSurfer as an emergency office machine. Because netbook keyboards are too small for serious typing, we can add that external keyboard and mouse we've got stashed in a box under the bed; those USB ports will work with a hub, so we can also connect an external HDD or a stick. In an ideal world, we'd be able to add an external monitor as well, but the UbiSurfer doesn't support this. Hoicking the font size up gets us by, though, giving a near-WYSIWYG half-a-page-of-A4 screen area.

So who might use such a thing? Pretty much anyone who's working to a deadline and whose computer packs up at the worst possible moment. If that coursework essay/report/job application needs to be in someone's inbox by tomorrow morning, this upcycled bespoke word processor (remember them?) can save your bacon. If your work is half-complete already, just use the latest backup you made onto your external drive. You back up online? Bear with me. Despite the machine's networking issues, if you own a smartphone, you can even e-mail the document there and then. Forget Bluetooth or anything similar, as this device has nothing of the sort. It does, however, have an SD card slot, so it's just a matter of installing a micro-SD card with an adapter, copying your stuff to it, then physically transferring the card to your smartphone and emailing the material from there. You should also be able to work in the other direction, as it were, by downloading backups from online storage onto your phone's micro-SD and then transferring the card to the netbook.

The Flatpack Office

Just by applying a little ingenuity, then, we've sorted out a useful standby office role for this seemingly unpromising item. We can do something very similar with the Archos tablet, because luckily it happens to have full USB implementation via the miniature socket, which is also used for charging the device. Its user interface can simply be accessed via USB peripherals, provided we invest a quid or so in an adapter that will convert the baby USB socket into a standard one.

If you really do need to use a non-touchy tablet for something approaching its original purpose, a handheld

Additionally...

There are plenty of other items of hardware that lend themselves to upcycling in different ways. A few from my own experience include an old all-in-one printer, which was too inaccurate for colour jobs but which was gratefully received by my local school's PTA as a portable mono photocopier; an underpowered laptop that ran Windows 7 far too slowly but proved to be a lot faster in safe mode and still had enough functionality to serve my student daughter as a backup machine, plus a monitor that no longer rendered colours properly but still worked well enough as an emergency spare for creating simple documents that didn't require accurate – or indeed any – use of colour. With so much electronic equipment waste being created, it's always good to think of ways in which its life can be extended.



▲ *edjing (sic) with DJ Archie*

trackball mouse will help up to a point, although you'll be stuck with clicking individual characters on the on-screen keyboard. Without that, however, this would just be a broken tablet – except to the upcycler, it's a superlightweight, noiseless, heatless laptop with long battery life, a built-in stand (it's got a foldout jobbie around the back) and a radical form factor that allows you to select your own choice of keyboard and pointing device. Not bad advertising copy for a supposedly broken product!

“ The trick to upcycling is not to worry about what something can't do ”

Backtracking slightly, the debate about the viability of tablets as office machines as well as being lifestyle toys is ongoing, but it's really a matter of horses for courses. Office work may be horribly complicated or may amount to nothing more than generating and distributing simple text documents or calculations. The former is really beyond the scope of any cheap tablet, the latter a walkover for our upcycled example, with any number of in-between scenarios also being possible.

The most useful feature this particular model has from this perspective is its 10.1" screen, which makes for a thoroughly usable typing area. It's then just a matter of adding a suitable keyboard, a mouse and any external storage you may need via a USB hub. If you use a compact keyboard and a travel mouse, you'll have an upcycled business 'laptop' that's far less bulky than many purpose-built equivalents. There's a generous swathe of Android office apps available, from which I've chosen WPS

Office as being fine for my needs. As usual, most are either cheap or free.

Playtime!

So far so good, then, but having removed any excuse for delivering work late by turning these two pieces of dudware into usable office machines, we've earned a little recreation. Our upcycled tablet will of course do all the things any other tablet could do in terms of accessing online entertainment and social media, but we can go one step further with both tablet and netbook by upcycling them in a different direction as, believe it or not, party DJ devices.

Now, I'm not suggesting for a moment that you could roam around clubland with either of these and expect to be taken seriously. However, if it's just a matter of assembling a playlist or two for a social gathering and being able to handle basic DJing requirements (managing your playlists on the fly to suit the mood, for example), then there's plenty of scope here for the grooveriding upcycler. There's also the added bonus of not worrying too much if someone spills an entire Bacardi Breezer over your kit because, unlike a proper laptop and a whizzy DJ controller, this stuff has zero cash value.

Analogue Upcycling

Once you take the idea of upcycling on board you may well find yourself spotting instances of it happening in the real world. People use house bricks as bookends, CDs as coasters, cereal boxes as magazine files and wire coat hangers as drain unblockers; the list is endless, but always interesting to add to. I've seen street cleaners in Turkey using dustpans made from upcycled olive oil cans, sandals made from old tyres and lampshades made from colanders (but not the reverse).



▲ 'Volume control'? It's really a USB soundcard

UbiScratcher?

The netbook's no-frills media player is tagged 'TCMP', indicating that it's actually CoreCodec's The Core Media Player (caps thus), a now-discontinued freeware predecessor of CorePlayer/CoreAVC. This was designed for portable devices and does the job well enough, although the long list of file types it claims to support may need to be taken with a pinch of salt if its apparent

“ The unit's 'My Computer' icon is actually an image of an old-school PDA ”

inability to work with AIFF files is anything to go by. However, it'll happily stack up a playlist of MP3s, which you can load via the card slot or a USB port, then play the tracks in sequence or pick them on the fly. There's also a shuffle option if you want to defeat the whole purpose of being a DJ.

Clearly, while you could simply connect the Ubi as is via its headphone socket to some amplified speakers, a hi-fi system or that 1000W PA setup you hired by mistake and have a stream of your chosen floor-fillers livening up your event, there's not much scope to actively engage with the music. You can tweak it with Core's equaliser, which allows you do a few dancefloory things like kill the bass on a track then dramatically drop it back in four bars later, but that's about it. However, if you have another audio source (your iPod, phone, a CD player or just a cheap MP3 player if you want to continue with the low-risk option), you can add a mixer and crossfade between tracks on the two devices. So rush out and buy a Pioneer DJM-2000 Nexus, a snip at £1,729. Or don't. Instead, try a B-Tech BT35, dating from 2005 and never bettered, or the incredulity-prompting Bluw Mini Mixer (pictured), either of which you

can find online for less than 20 quid. The former just has two passive faders, one for each device; the latter has a single crossfader, runs on batteries, comes with a hinged metal lid and looks like what we might expect if Apple ever launched a line of tinned cough sweets. Budget another tenner or so and you'll find a choice of several other models. All you need to do now is sort out what you'll need by way of connecting cables, but you can do that 'cos you're a DJ now, innit?

I Don't Wanna Rock, DJ

This not being DJ Mart, we needn't be sidetracked into the minutiae of DJ setups and technique, but it's worth mentioning that the UbiSurfer-based mixer approach won't allow you to vary the speed of your tracks so that you can match their beats into a seamless sequence; instead, you'll end up simply fading one tune into the next. This is hardly a problem in a party situation, as the chances are you'll be playing well-known tunes, which no one will want to hear at the wrong speed anyway, while you'll still achieve the aim of keeping people dancing rather than having irritating silences between tracks.

Our non-tactile Android tablet, on the other hand, takes us into more sophisticated territory. There's actually no shortage of bespoke DJ software available for the Android platform, which will let you do quite a lot of the clever stuff real DJs do. My current favourite is the trendily uncapitalised edjing (see edjing.com), which comes in both a free and a pro version with more features. This app lets you load two virtual discs onto on-screen turntables, then fade/crossfade them, 'scratch' them, match their beats (automatically if you're nervous) and apply various effects to the music. So far so cool, then, but why is this app of particular interest to upcyclers?

Broken Beats

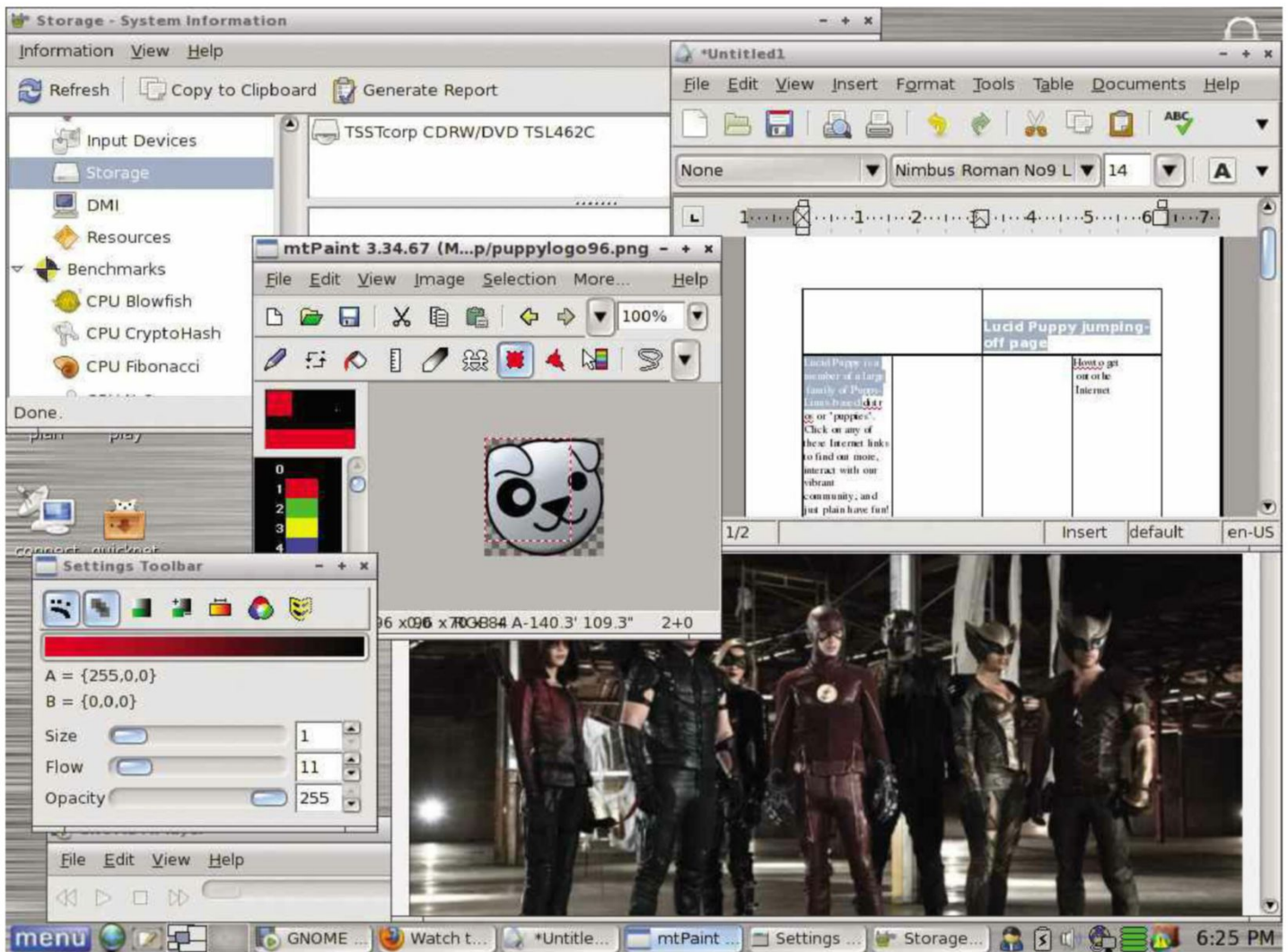
Upcycling is particularly satisfying when the item's apparent shortcomings can be turned to the user's advantage. In the case of edjing, the idea is that all the manipulations you need to do are performed on screen. We often don't notice minor misreads on touchscreens, so if, for example, we click on a link or try to swipe from one page of a document to the next and nothing happens, we simply repeat the action, which usually works. We put the problem down to a greasy spot on the screen or dithering fingers (probably correctly) and promptly forget about it.

However, software-based DJing is much less forgiving. If you attempt an adjustment and it doesn't happen right there and then, you've had it, as you'll end up with a timing mismatch, an embarrassing silence or some other calamity. For this reason, there's a positive advantage to using an external pointing device, as its action is always going to be more reliable, so the fact that you can't use the touchscreen is a useful fault in this context. Choose whatever device you prefer; I personally like using a USB trackpad.

If you want jam on it, Android will also work with certain external soundcards, such as the Fostex PC100 USB. It's a bit hit or miss – some it won't see at all, others it will run uncontrollably on full blast – but if you've got one handy, it's worth a try. Party on!

Lacking Drive

How, though, can a laptop without a hard drive be useful for anything at all? Allow me to refer you to that wonderful little beast, Puppy Linux. The virtues of this lightweight OS have often been outlined in this very organ, but there's one interesting wrinkle to Puppy that particularly applies here. Many Linux



▲ Who needs a hard drive when you've got a Puppy?

distros can run from the installation media on a try-before-you-install basis. Puppy, however, can run entirely from RAM. The absence of a hard drive doesn't affect Puppy, because it doesn't need one; the OS, its bundled applications and anything you do with them can simply reside in the machine's memory sticks.

“ Did somebody mention the word ‘Chromebook’? ”

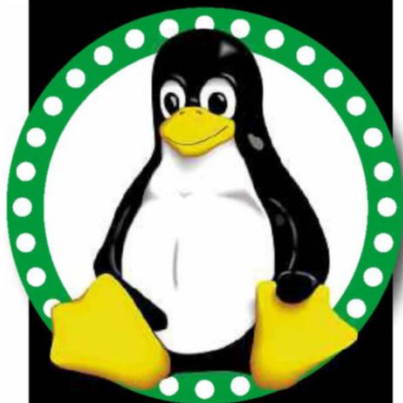
Usefully, our laptop has a generous amount of RAM by Puppy's undemanding standards, meaning there's plenty of space for things to happen. All the stuff you see in the screenshot is running simultaneously in real time, including that TV show trailer (and note the absence of a hard drive in the storage report window – it's all true, y'know). Also, bearing in mind that, quite apart from cloud storage, virtually any operation, from word processing to photo editing, can be done using online resources these days (try [zoho.com](https://www.zoho.com) and [pixlr.com](https://www.pixlr.com) respectively), what have we reinvented on the cheap by upcycling this machine with Puppy's assistance? Did somebody mention the word 'Chromebook'? Just saying...

Puppy To The Rescue

Upcycling a driveless laptop using Puppy Linux coincidentally draws attention to the OS's usefulness as a time-saving diagnostic tool. If you have a Windows computer with a mysterious fault, try loading Puppy into the machine's RAM. If it installs and functions comprehensively, then you can immediately eliminate everything from your enquiries except the hard drive. The problem must by default be either the drive itself or something on it, such as a corrupt OS or a dodgy driver or application, because you now know that everything else works. Good dog!

Case Closed

Just to reiterate, these are case studies: these particular items happened to be to hand, need very little cupboard space and don't represent unrealised assets, as they are otherwise worthless. I'm not suggesting for a moment that you should scour jumble sales looking for these specific bits of kit, as your own examples will soon suggest themselves. What I hope to have demonstrated in general is how we can upcycle so much seemingly flakey gear if we stop to think about what it can actually do, thus saving waste and pleasantly surprising ourselves. Anyway, must dash – I need to buy some more marmalade. [mm](#)



David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

Linux

Cinnamon Flavoured Rosa

A new minty outlook

December 4th saw the release of Linux Mint 17.3 Rosa Cinnamon, an LTS release that's going to be supported until 2019 and with many updates and refinements to an already excellently devised distro.

Among the many improvements to Mint 17.3 Rosa is an update to the Software Sources, which will now detect your location and automatically run a speed test to make sure you're downloading from the fastest available servers.

The speed tests runs in three layers, with the first layer looking for server mirrors as local as possible to you and within your own country. The second layer then looks to neighbouring countries to find the fastest servers, and the third and final layer will take into account your region of the world – which in our case would consist of all the European servers.

In addition to the speed checks and faster sources, the Update Manager works with the information already passed on through the new Software Sources and will check to see if the mirror you're using is currently up to date.

If it's not, then you'll be able to select from another source, and you can remove the old update from the Update Manager. This way, you're always getting the latest and tested software for Mint. There's also a slight addition to this in the form of an updated Driver Manager, where it'll refresh the cache before looking for drivers and updates – plus it'll report whether the drivers are open source or not.

New Cinnamon

Cinnamon 2.8 is included with Rosa, with a new layout for the sound applet, making it a lot bigger in terms of the amount of screen it takes up when launched and significantly clearer too.

You'll also find that with Cinnamon 2.8, input controls, applications and output devices have been moved to the right-click context menu. It keeps everything a little neater than before and feels a lot more fluid.

Battery life through the power applet seems better too, and it handles multiple batteries and power saving features through a better looking set of tabbed screens.

I also liked the fact that the Workspace Switcher applet is now capable of giving you a visual representation of the current Workspaces, with placement rectangles indicating the positioning of the windows within each Workspace. It's a small additional feature, but it's one that's really quite interesting.

More Improvements

As with each new Mint edition, Clem and the team have made

some visual improvements as well some performance enhancements.

The team, though, has taken the decision to remove Preloading from version Cinnamon 2.8, which appeared in Cinnamon 2.6, citing that the gains made by preloading elements of Cinnamon in the background while you were presented with the password screen were actually quite marginal. It also came apparent that preloading slowed down the start-up sequence, so it has now been removed.

Needless to say, there are countless other improvements in Linux Mint 17.3 – far too many to mention here. If you're interested in seeing what's been added, removed and enhanced, then you can take a look at the Linux Mint launch page and read up on the latest news from there.

It looks like Mint 17.3 is going to be one of my main distros for quite some time. What feedback do you have from 17.3? Let us know.

▼ *Minty freshness, all the way to 2019*



Amiga Forever 2016

Sven checks out the latest version of this emulation package

Since the initial release of Amiga Forever in 1997, Cloanto has continued to develop the Amiga Forever software suite and supported the development of its main component, WinUAE, and other emulation projects. Cloanto also owns the rights to the AmigaOS from 1.0 to 3.1 and thus is the only company allowed to license Kickstart images, physical Kickstart ROMs and AmigaOS packages, and Workbench disks prior to Hyperon Entertainment's AmigaOS 4.x.

There are three versions of the package, but the Value edition only deals with A500 emulation, so let's skip that for the purposes of this review.

The plus edition is an .iso download, which you can either boot into an Amiga OS environment from via KX Light (a refined version of the Knoppix Linux distribution), or you can load up certain emulation environments from the autorun menu or alternatively do a full installation, which offers a couple more extra options such as fully featured customised AmigaOS 3.9 environments such as AmiKit and AmiSYS, which are the latest versions (and you will be offered upgrades by download). The package also includes various games and scene demos, as well as software such as Personal Paint pre-installed in the higher-end AmigaOS 3.x environments.

The Premium edition offers all these options but also includes archival videos on the three DVDs from the Commodore era of the Amiga story – including the footage of the launch of the Amiga in New York with Debbie Harry and Andy Warhol, plus the infamous Deathbed Vigil home video shot by Dave Haynie as Commodore Business Machines' main facility in West Chester was being shut down during the

death of the original company in 1994.

The environments you can 'boot' into as part of the emulation range from a Commodore Amiga 1000/2000/500 machine running Amiga OS 1.x, up to the CD32 and Amiga 4000 with memory and processor expansions running Amiga OS 3.x. So far I haven't been able to find a piece of 'normal' Amiga software (as an ADF) that it can't run (PowerPC software including AmigaOS 4.x and the likes of WipEout 2097 can now run, but I haven't been able to test this yet, due to a lack of the classic version of AmigaOS 4.x). Some games need a bit of emulation tweaking, though.

Since the last full release (2014), the user interface has been upgraded to support 4K and multi-monitor setups, and it also allows Amiga Forever and C64 Forever to launch from the same interface, assuming they're both installed.

Also newly included is the option to emulate a PowerPC enhanced Amiga 4000, which semi-officially includes support for drivers for the classic Amiga version of AmigaOS 4.1 Final Edition (which is available for less than £30).

Also added are various new Amiga device drivers to allow PC hardware to pretend to be Amiga tech, various new software options such as the latest AmiKit

and ROM versions, while a rather useful shared folder that is visible to various virtual machine setups within the emulation package allows your files to be shared between emulation experiences (i.e. to allow files on your virtual A2000 to be shared with your virtual A4000 PPC!).

The general experience is brilliant and certainly brings back the feeling of using a classic Amiga. It's not entirely a perfect replication of the older machines, but it's as close as you can get with PC hardware. Certainly highly recommended!

The physical version is also available from UK retailer AmigaKit at goo.gl/DUCSrR.

DETAILS

- Value Edition (download) – €9.95, Plus Edition (download) – €29.95, Premium Edition (physical) – €49.95
- Cloanto – www.amigaforever.com
- Requirements: Windows XP or later



Sven Harvey has been our Amiga specialist for over 16 years, drawing on his 25 years retailing computer and video games and even longer writing about them

Amiga



Ian McGurran is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

Tablets For Christmas 2015

Ian looks at the best big screen for your money this Christmas

2014 was a pretty good year for tablets, with some impressive devices debuting and a raft of cracking low-end products finally offering full HD on a budget. So what has 2015 been like? Like 2014, really – literally, as many companies have not updated their 2014 devices or, in some cases, released a different product that doesn't strictly replace it. Anyway, let's get to the rundown.

Up To £149

The biggest news in tablets came at both ends of the price bracket, with the lowest end making waves for under £50. Yes the first sub £50 tablet from a major name came in the form of the Amazon Fire 7, a tablet built to a price without a doubt. Yes, it's a dirt cheap device and yes, it's actually quite kid-friendly, in a megacorporation kind of way, and you can even put Google Play on it without much fuss. But the screen is pretty poor, and the chip not much better. A little more money will get you more: nothing newer than 2014's best, the Google Nexus 7 2013 is still hanging on, and at £109, it's a good price. Lenovo's excellent S8 now runs Lollipop and looks great for around £129, although is getting hard to find. Even the iPad Mini Retina can be found around £149 on refurbished sites and is still an excellent buy for that price. But if you bought a tablet in 2014, there's little chance of anything released this year being vastly more powerful.

£149 - £299

Things get a little more interesting here with cut prices, new tech and even a keyboard. Asus's ZenPad S is probably the closest to 2014's Lenovo

S8, with high-end specs at cut prices. Here it's the excellent 8" QuadHD display grabbing the headlines, with an Intel CPU packing around the same grunt as a Note 4 inside that makes this £159 tablet of note. If you want more raw power, with less looks, Nvidia's latest Shield tablet, the K1 is for you. Pushed as a gaming tablet, it runs Nvidia's latest desktop-derived tablet GPU and is capable of running all the Shield software, such as game streaming. At £149, it's not pretty, but frankly eats many others for lunch.

£300+

Like the budget range, the top end hasn't seen so much action this year, partly due to no official Nexus tablet (and the Pixel C has yet to appear), as well as the release of devices like the iPad Pro and the Samsung Galaxy View. You can argue that the iPad Pro replaces the iPad Air 2, but Apple hasn't withdrawn the Air 2, and has made clear that the £679+ device is closer to a laptop than an Air 2 replacement. In terms of value and power, the best iOS tablet is still the 64GB iPad Air 2. Samsung has taken

its usual scattergun approach to tablets, although we did get a Galaxy Tab S2, taking 2014's flawed diamond and refining it, including being another device to opt for a 4:3 iPad-like screen, squaring up to Apple face on. It's a great tablet, faster than before (naturally), but it might not convert those who just don't like Samsung's way of doing things. Lastly, there's the excellent Surface 3, now with Windows 10, still with a gorgeous screen and arguably one of the most productive tablets you can get under £500. If you're prepared to think computer-cum-tablet and not tablet-cum-computer when looking for a device, the Surface is probably the best here, just as long as you don't expect it to be like an iPad.

So 2015: not a vintage year for tablets, and more than an air of companies running out of ideas and seeing what left-of-field concepts stick. Given tablets appeared to reach a good price to power ratio in 2014, there's not much incentive to upgrade this time round either. But it's as good a time as any to dive in if you're still without a tablet, and at a great price.



Cross The Streams

Andrew Unsworth says video streamers make a great last-minute present

If you're anything like me, you'll be scratching around for a last-minute present right about now. My family and friends all have a roof over their heads, all have food to eat, and most have good health or at least good enough to see them through the festive period. I love tech and I want other people to enjoy it too, which is why I mostly buy tech-oriented presents for everyone around this time of year, but what do you buy for someone who, compared to the vast majority of people who have gone before them, want for nothing?

One tech product that I often overlook, mostly because it's right under my nose and is thus rendered too obvious, is the media streamer. It was a chance conversation with my sister that reminded me of it. She's moving into her own home and wants a means of watching Sky TV programmes without having to get a dish and a regular Sky box. One of her friends had recommended a Now TV box (www.nowtv.com/box), which is a small, discrete box that lets users watch Sky TV channels, movies and sports on an ad-hoc basis, so there's no need for a contract. Best of all, it costs just £15-20, which is remarkably cheap.

The Now TV box is a neat bit of kit, and a good choice for anyone wanting to dip their toe into Sky's catalogue of box sets, watch important sports games and watch movies. Unlike the original Now TV box, the latest box lets you access media from other content providers, and users can watch catch-up TV from other content providers such as the BBC, as well as listen to tunes on Spotify.

The Now TV box is based on the Roku brand of media streamers, and all this talk of Now TV reminded me of the Roku 3 under my TV. At £100 (tinyurl.com/o4jojgr), the Roku 3 is more expensive than the Now TV box, and it shares some common traits such as the menuing system, but it has a lot more to recommend it besides.

Roku produces three different types of Roku-branded boxes: the Roku 1, Roku2 and Roku 3. It also produces the Roku Streaming Stick, which is a wonderfully compact device that draws power from your TV's USB port and pushes pictures into your TV through its HDMI port. The Roku 1 isn't available in the UK, just the Roku 2 and Roku 3.

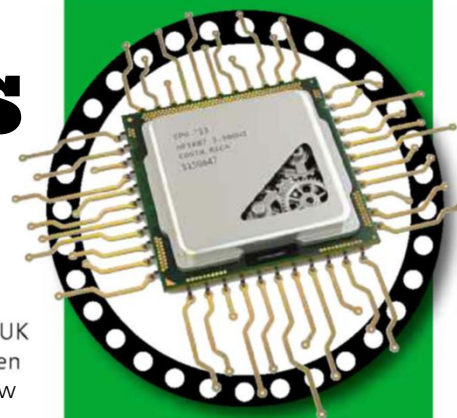
Like the Now TV box, these more expensive streamers let

you watch Now TV, popular UK catch-up TV services and listen to Spotify, but unlike the Now TV box, they'll also let you watch competing subscription services such as Netflix. The Roku 3 comes with a wi-fi remote control with motion control too, so you can point it anywhere and it'll work, which comes in handy when playing classic and addictive games such as *Angry Birds* and *Tetris*. The Roku 3 even has a headphone port on the remote control so you can listen to audio wirelessly through standard headphones.

The Roku 2 and Roku 3 devices also output video at resolutions up to 1080p while the Now TV box only outputs video up to a resolution of 720p.

I've seen the Roku brand evolve from great hardware with so-so content to even better hardware with great content support, and a Roku box, a Now TV box and especially the Roku streaming stick would make a great stocking filler for someone.

There are, of course, other important media streamers such as the Apple TV, Chromecast and the Amazon Fire TV, and we'll be taking a look at those in the new year.



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner and his handshaking skills are second to none

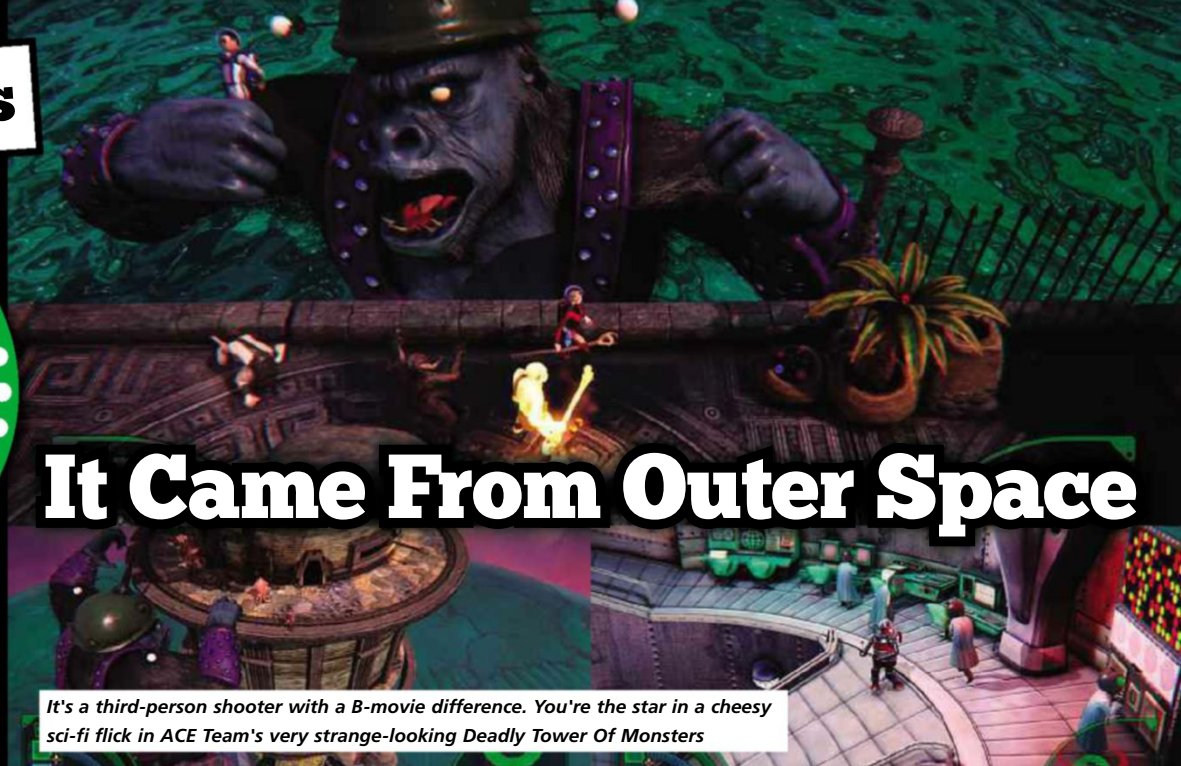
Hardware





Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

Gaming



It Came From Outer Space

It's a third-person shooter with a B-movie difference. You're the star in a cheesy sci-fi flick in ACE Team's very strange-looking *Deadly Tower Of Monsters*

This week, Ryan checks out a B-movie themed shooter from the creators of *Zeno Clash*, and looks at Epic Games' pretender to the MOBA crown...

Plug & Play

Based in Santiago, Chile, ACE Team have brought us some of the most enjoyably odd games of recent years. This is the team behind the first-person beat-em-up *Zeno Clash* and its 2013 sequel, medieval-themed action strategy game *Rock Of Ages* – where you defended your tower by pushing a giant, smiling ball around – and *Abyss Odyssey*, a bewildering Art Nouveau amalgam of dungeon crawler and fighting game.

Next there's *Deadly Tower Of Monsters*, a third-person shooter that appears to involve fighting to the top of, well, a deadly tower of monsters. Like ACE Team's previous games, it displays a warped sense of humour and a unique visual style; the conceit here is that the action takes place on the set of a cheap 1970s B-movie, complete with ropey special effects. This means that the intrepid, Buck Rogers-like hero's really a Z-list actor, and a robot side-kick's played by a stuntman in a suit. You'll also find a huge, Kong-like gorilla, which moves around with the unmistakable jerkiness of early stop motion animation, while the hero's ship flies is clearly guided along with bits of fishing line.

Deadly Tower Of Monsters' action and visuals recall Atari's half-forgotten 80s arcade game *Escape From The Planet Of The Robot Monsters*, which was another third-person run-and-gun inspired by cheesy old sci-fi movies. But a combination of superior processing power and ACE Team's surreal imagination mean that *Deadly Tower* has a look and feel all its own; pew-pew ray guns are joined by laser whips (think lightsabers, but kinkier), crystal swords and other curious weapons. On-foot sections are joined by segments where you leap from tower ramparts and shoot flying saucers on the way down. Play can also switch between macho hero Dick Starspeed, co-star Scarlet Nova, and the aforementioned robot, though disappointingly, there's no two- or three-player co-op mode.

Nevertheless, *Deadly Tower Of Monsters* looks like another likeably weird game from ACE Team. The only potential cloud on the horizon being a "laugh-a-minute director commentary" courtesy of the fictional film's director, Dan Smith. While we're sure it's amusing, we hope there's an option to turn it off. We'll know soon enough, as *Deadly Tower Of Monsters* is due to be available in January.

Online

It seems as though just about every major studio's jumping on the MOBA wagon of late, whether it's Blizzard's *Heroes of The Storm*, Crytek's forthcoming *Arena Of Fate* or Gearbox's *Battleborn*. To that list we can now add a new pretender to the MOBA crown: *Paragon*. While the genre's becoming increasingly crowded these days, there's a good reason to pay attention to this one – it's from Epic, the studio behind such games as *Gears Of War* and *Unreal Tournament*.

Formally unveiled on the 5th December, *Paragon* is Epic's take on the "classic" MOBA in the mould of *League Of Legends*; two teams of five players face off on a map with three lanes and a vulnerable enemy building. There are non-player minions and towers to defend, while the strategic depth of the game's deepened by unlocking and using cards, which alter player characters' stats.

In line with numerous other modern games, whether in the MOBA genre or, say, Blizzard's forthcoming *Overwatch*, *Paragon* introduces its own disparate band of characters to choose from. Twin Blast is a dual pistol-wielding soldier clad in



▲ Unreal Tournament legends Epic Games is getting into the MOBA market with *Paragon*, due out next year. A *League Of Legends* beater? We'll have to wait and see

high-tech battle suit; Sparrow's an archer who looks uncannily like a cross between *The Hunger Games*' Katniss Everdeen and *The Hobbit*'s Tauriel; Grux is a weird alien-type-thing who uses magic and melee attacks; Dekker's a sword-wielding warrior clad in *Mass Effect*-like armour and Steel's a humongous, slow-moving alien, who specialises in letting off devastating energy blasts.

While *Paragon* doesn't appear to break the MOBA mould, the game does bear Epic's hallmarks. The first gameplay footage (youtu.be/1Gw9fJGKvcc) shows off the game's chunky, bold character designs, while the detail in the map (which looks a bit like Asgard from the *Thor* movies) is eye-poppingly gorgeous. Epic's long, long history in crafting

online shooters also gives us hope that *Paragon* will be a balanced and slick multiplayer experience – and hopefully, the studio will also find a way to help newcomers ease their way into a genre that offers a steep learning curve to the uninitiated.

The greater question, though, is whether *Paragon* can compete with the big hitters in the MOBA genre, even with a studio of Epic's pedigree behind it. It's certainly the case that other, similarly promising examples of the genre have failed to make their mark; Turbine and Warner Interactive's expensive, much-vaunted *Infinite Crisis* lasted just six months before it was shut down in August this year, and that was a game with the weight of such famous DC characters as Superman and Batman behind it.

Right now, *League Of Legends* remains the seemingly unassailable king of MOBAs, with a startling 27 million daily players as of January 2014. In the world of e-sports, it is similarly gigantic; millions watched the 2015 World Championship in October, where the team SK Telecom T1 retained their title for a second year, and walked away with \$1 million in prize money.

Can *Paragon*'s sci-fi take on the genre even come close to garnering the kind of fame enjoyed by the high-fantasy trappings of *League Of Legends*? With the game entering Early Access in spring 2016 and its Open Beta scheduled to begin in the summer, it won't be too long before we find out.

Incoming

Ubisoft has proved adept at pushing the *Far Cry* games in new directions. *Far Cry Primal*, for example, is eschewing machine guns and grenades for an experience that focuses entirely on hunting and survival. Taking place in a prehistoric time where rival tribes eke out an existence, it looks tough, gritty and toothsome – indeed, *Primal*'s latest trailer (youtu.be/1rl6dMVu6Xc) shows how we'll either be hunted by deadly animals (wolves, bears, sabre tooth tigers) or, if we're really skilful, be able to tame them and use them as weapons against our enemies.

Ever wanted to ride into battle on the back of a tiger? Reader, meet *Far Cry Primal*, your new best friend – who you can team up with from February 23rd.



▲ Ride around on tigers and hunt woolly mammoths in Ubisoft's forthcoming survival spin-off, *Far Cry Primal*. Spear not included

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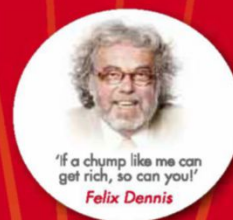
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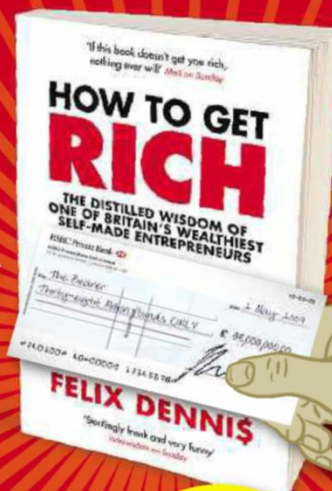
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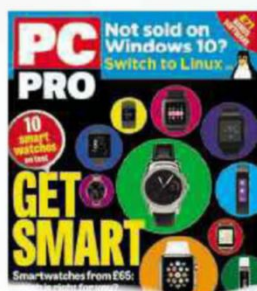
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Aaron

Update control

As a PC user who lives in the country where I'm unable to get broadband, even in 2015, the only option I have is to use my 3G account when I need to access the Internet. For day to day use, this is fine, and I manage without too many problems. That's when I have control over it, though.

I used a substantial amount of my allocated data upgrading to Windows 10 recently, so much so I was forced to pack up my PC and drive several miles to a friends in order to upgrade. I now find myself with problems when Windows 10 wants to upgrade every once in a while, which it seems to do on its own, without my say so. I didn't set up my old system (Windows 7), but I know I had it set to always ask me before any updates were installed. This doesn't appear to be the case any more, and I find Windows 10 likes to use my data up whenever it likes.

I'd like to have a bit more control over my data use, and would appreciate any advice you can give me.

Paul

The idea of automatic updates seems great on paper – as not having to worry about updates to your operating system, and always being up to date and secure is a good thing. However, as with many things in life, what's good on paper isn't always enticing off it. This is especially true of these updates if you happen to be on a limited data plan, and you have to watch your usage, lest you be hit with extra costs.

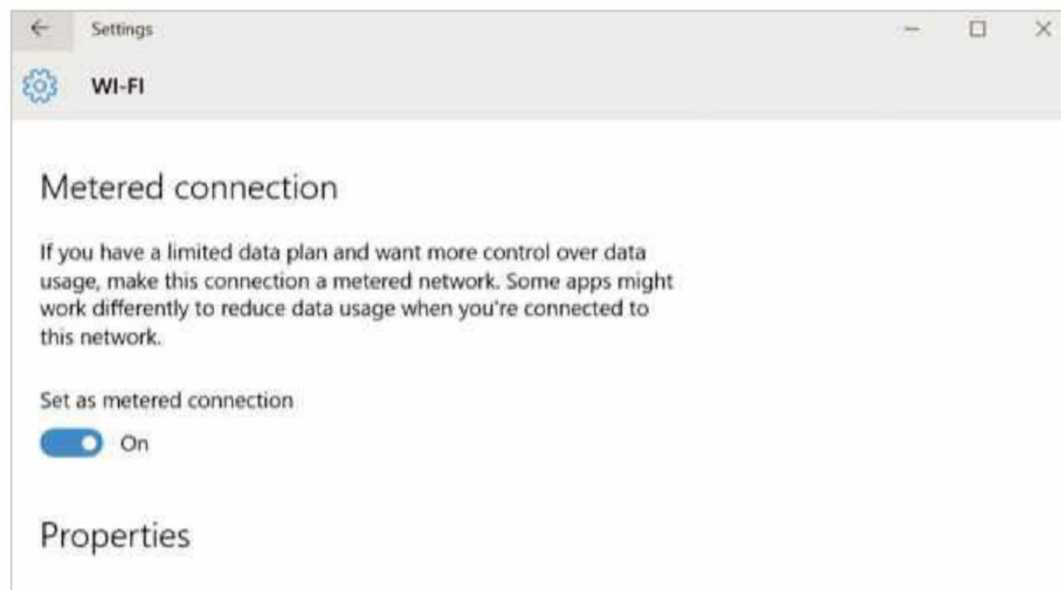
Over the years Windows has allowed you to restrict automatic downloads and updates, but it's also introduced other options – including the always irritating automatic shutdown,

which Windows 8 got down to a fine art in terms of seemingly timing its restarts to perfectly interrupt your work at the most unsuitable moment imaginable..

Windows 10 also has this array of automatic features, but it also gives you more control than previous versions of Windows, including a useful option for those on limited data connections. In particular, an option that should help you in your situation. This is the ability to change Windows' update system to operate in a 'metered' mode.

**“ Automatic
updates seem great
on paper ”**

This is designed for limited data plans just like yours, and gives you control over what goes on. Windows 10 should set to this automatically if it detect that it's on mobile connection, but maybe your system has not done this for some reason, so you should make sure you enable it. You can do so by opening up the Settings app and then going into Network & Internet. Go to Advanced Options – which you'll find below your list of networks – and set the Metered option to On. This will force Windows to prompt you when updates are available that it wants to download, giving you the choice of if and when to proceed with the installation. If you connect to a standard Wi-Fi connection, it should also download them automatically again.



▲ Windows 10's metered mode can ensure you don't go over your data limits

Although it was not specifically part of your question, you may be interested in stopping Windows from automatically restarting when updates are ready to be installed. To do this in Windows 10, go back into the Settings app and then into Updates & Security. Go into Advanced Options and then click Notify to schedule restart instead of Automatic (recommended). This will now ask you when to restart, instead of forcing you to do so when it's not convenient.

► Make sure you choose how Windows handles updates to avoid any unwanted data use



I Don't Like It

I had problems with a couple of specific Windows 10 updates that were automatically downloaded by Windows previously, and it took a while to fix. Eventually I managed to solve the problem, which involved manually removing these updates. It was a bit of a pain, but it worked. My PC was fine, and I was happy.

Then, Windows went and downloaded the same problem updates again, and I had to do the exact same thing, which worked, but I don't relish the idea of having to do this same thing every couple of weeks.

How can I avoid this? From what I know, I don't actually need these updates, but Windows keeps grabbing them anyway. I'd be very thankful for some help here.

Finn

Windows updates can be overly eager to download everything, regardless of their use to you, even if they cause problems. Thankfully, you can stop this by downloading a special tool from Microsoft. This is the 'Show or hide updates troubleshooter'. Using this you can opt to hide specific updates, causing Windows to ignore them in future.

You can get this tool from **bit.ly/10eaQtH**. Please note, this is for Windows 10 only, and won't work on earlier versions of the OS.

If you have a Professional, Enterprise or Education version of Windows 10 there's also another possible option for deciding what Windows will do with updates. This

lies within the Group Policy Editor. You can get to this by pressing Windows+R and typing 'gpedit.msc' and pressing Enter. This will open up the Group Policy Editor where you can control a huge range of Windows' settings, including auto updates.

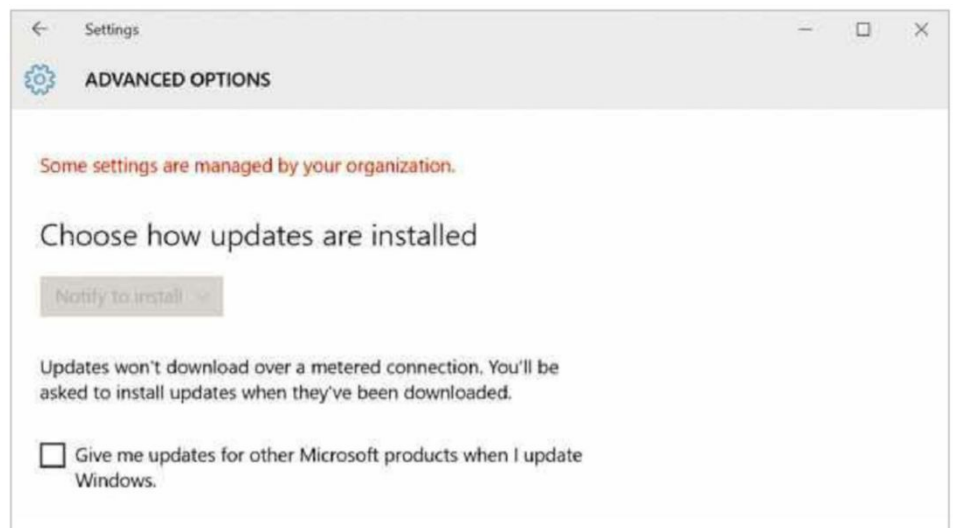
Browse through the list and navigate to Computer Configuration > Administrative Templates > Windows Components > Windows Update. Then go into the Configure Automatic Updates option and set it to Enabled. Under the Options section you'll find a drop-down list of possible settings, including the choice to notify for both download and install, auto download and install, auto download and scheduled install, and finally, allow local admin to choose.

Once you set this option, it'll override any settings within the main Windows Update

section. Group Policies are usually used in a business network environment to enforce company rules and regulations, but there's no reason you can't make use of these at home if you have the required edition of Windows.

I should point out that turning off automatic updates isn't something everyone should do, and it's an option that should be employed only to solve problems. Automatic updates, when enabled, ensures your PC has the latest Windows updates. This includes security patches, of which there are many. Missing out on these will leave your system open to possible attack, so always be careful when changing these settings and be aware of the potential security concerns.

▼ Group Policy settings will override user-inputs, and are used by network admins to control systems



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Jason

Access No Areas

Here's someone else with Windows 10 woes...

I'm having trouble sharing some of my Dropbox files. I've been sending relatives some download links, but apparently Microsoft's new Edge browser is throwing up security alerts and blocking them. This doesn't happen with all the files, just three or four out of maybe 50 or so. I know for sure that these files aren't harmful. I've asked the relatives to use Chrome instead, but they're pretty inexperienced and don't really understand. What do you suggest?

P McNulty, Gmail

This is the work of Microsoft's SmartScreen Filter. It aims to monitor the websites you visit and block access to any it deems suspect. It also scans downloads. Most modern browsers use similar technologies.

SmartScreen Filter was introduced in Internet Explorer 8 and in general works well and isn't intrusive. Microsoft maintains a database of known-good websites, and if a visited site isn't listed, SmartScreen Filter gives an alert. I'm not at all clear about what goes on in the analysis of downloads, however.

For reasons unknown, some of your shared files are

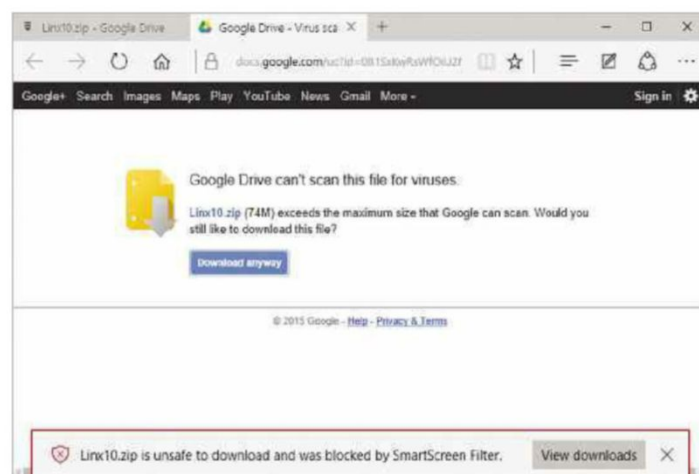
setting off alarm bells. Often, SmartScreen Filter just gives a warning and lets users proceed if they want to. But in Edge (only available in Windows 10), there's a new DEFCON 1 alert: users just get a close button. This is what your relatives are seeing – there's no option to proceed. I'm sure Microsoft has our best interests at heart, but I think it's got some brass neck to take control away like that.

As you say, one workaround is to use a different browser. Another option is to disable SmartScreen Filter just as long as needed. That's done by clicking Edge's menu icon (the three dots at top-right), selecting Settings, clicking 'View advanced settings', looking for 'Help protect me from malicious sites and downloads with SmartScreen Filter', and

switching this to Off. Now, if your relatives aren't comfortable with trying a different browser, they're probably not going to want to mess about with settings either. Could you just email the files?

Note – I've just discovered that Edge throws a hissy fit at the 'Linx10.zip' download mentioned above. It seems SmartScreen Filter pokes around inside, raising its eyebrows at the .bat and .reg files. Yes, such files have the power to trash a PC utterly, but I can confirm that these examples are harmless. Chrome lets the download through without skipping a beat.

▼ **Let us make our own decisions!**



The Big Issue

This issue of Micro Mart is on the shelves for two whole weeks, which means only one thing – merry Christmas! That's if you've bought it early on, of course. If you've been lax and the rosy-cheeked chap with the jingling bells has been and gone, well, I hope it was a good one.

I'm ahead of the game this year. I've not bought any presents yet – no need to start on that till at least the 23rd – but all the decorations are up. It was a challenge, mind. I bought a new tree, a seven-foot fake thing with integrated lights, and after I'd spent an hour building it, it didn't work. Not a sausage. So I spent another hour wrestling it back into the box and getting it swapped. At least my 15-year-old bubble-blowing Santa is still in good health...

Anyway, friends and neighbours, I wish you all the very best. If you get bored of left-over turkey, want to share your excitement for your new geeky gadgets, or are just feeling a bit low (Christmas and New Year aren't such great events for some of us, I know), feel free to pop up for a chat on Facebook. I'll be online on Christmas Day and New Year's Eve and for much of the time in between. I'm at www.facebook.com/jasondallison. You don't need to be on my friends list – my account's open to everyone. For now, though, I'm off to buy the festive edition of the *Radio Times*. I wonder what repeats are on the telly again this year?

The Linx Effect

Recently I bought a second-hand Linx 10 tablet. Sadly, rotation didn't work – the display was stuck in landscape mode, making certain apps virtually unusable. I sent the tablet back. Well, I've just bought another, and at first rotation worked fine. However, the original OS was Windows 8.1, and I've now upgraded to Windows 10. And rotation has broken. The first tablet had already been upgraded to Windows 10, so I now realise it probably wasn't faulty at all. Oops! Is the Linx 10 just not compatible with Microsoft's latest?

Kieron, Gmail

This is caused simply by a dodgy driver for the Kionix accelerometer. Thankfully, Kieron, there's an update. Using the Linx 10, visit goo.gl/ssWSBD and download 'Linx10.zip'. Unzip it. You'll now have drivers galore, but all you're interested in are the four files in the subfolder called 'G-sonser' (sic). Double-click 'kionix_autorun.bat' and let the magic happen.

If the Linx 10 doesn't reboot automatically, reboot it yourself. There should then be a new entry in the quick-settings section of Windows 10's Action Center (sic again) – 'Rotation lock'. If this is enabled, disable it. You can then start enjoying all those apps that need portrait mode.

Note – The Linx 7 and 8 have the same issue, and the updated drives can be found in the same place. The Linx 810 and 1010, the updated models, come with Windows 10 pre-installed and are already patched. Oddly, there's no Linx 710.

▼ Like Constable, Linx tablets can get stuck in landscape mode



Service With A Scowl

It would be a shame to break the trend...

I'm trying to upgrade my Toshiba Satellite C50D-B-120 laptop to Windows 10. It's currently running Windows 7 – a fresh install from the recovery partition. The setup app downloads the required files and seems to progress as expected, but when it gets to 'Checking for updates' it just sits forever at 0%. I have to cancel or reboot. I've tried the upgrade several times now – each time, nearly 4GB of files have to be re-downloaded – and it's the same story. Any ideas?

Ron Harris, Hampshire

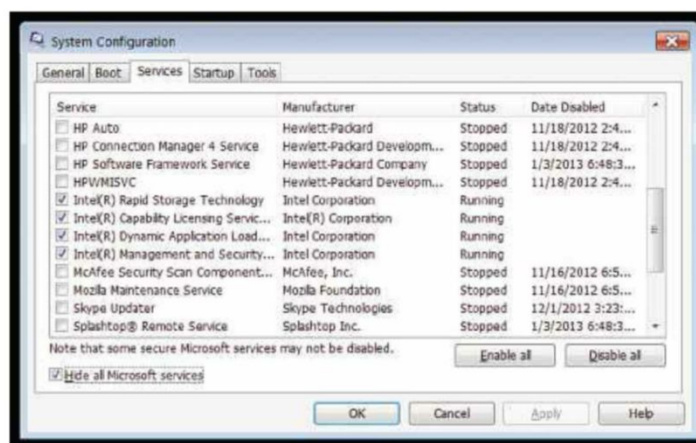
I've encountered this myself, and the culprit is usually all the crud that PC manufacturers love to pre-install. I worked on a Lenovo tower earlier this week that was so slow after a factory reset, I felt sure the hard drive was broken. But once I'd done a clear-out, the machine went like shale off a shovel.

Anyway, Ron, the order of the day is to launch Windows 7's System Configuration tool. The easiest way is to type 'msconfig' in the search bar and hit the enter key. When you're in, select the Services tab. Tick the box labelled 'Hide all Microsoft services' and then click 'Disable all'. Next, select the Startup tab. Untick everything.

Finally, reboot. Only essential services will now be running, and all the Toshiba junk will have been strangled at birth. It's my guess that the troublemaker was probably just something from McAfee or Norton, but why mess about? Halt everything and you can't miss. Of course, the laptop will be temporarily unprotected, but that's not uncommon during an OS installation.

Your Windows 10 upgrade should now go as planned. Be patient, though, Ron, as progress won't be fast and there could still be occasions when you think things have stalled. Also, when asked what you want to keep, I recommend choosing 'Nothing' or 'Keep personal files only'. This will give you an OS free from all that bloatware. If you decide to choose 'Keep personal files and apps' (where's the 'Keep apps only' option, I wonder?), remember that you may have to re-enable all the stuff you previously disabled. Be very selective with those start-up programs. Indeed, you'd be wise to uninstall most of them altogether.

▼ What would we do without 'msconfig', eh?



Crowdfunding Corner

The great thing about crowdfunding is that it allows good ideas that haven't yet been tested the chance to prove themselves in the tech marketplace. That's why this week, we have two Kickstarter projects for you that are unlike anything on sale today.

YoCam: Tiny Waterproof Camera

The YoCam is a miniature waterproof camera that, according to its maker, works in the place of a GoPro, DropCam, Lifelogging Camera, Selfie Camera, Dash Cam and more. That's a lot to live up to!

Still, it may yet be up to it. Designed to replace bulky 'action' cameras and provide a discreet, portable camera for everyday use, the YoCam weighs just 55g, records 2.7K video, is rated IP68 waterproof (depths of 20 feet) and has a super-wide 140° lens. Its capabilities include image stabilisation, P2P remote connections, wi-fi and Bluetooth connectivity. There's even one-click photobook generation built in.

There are some early bird specials, but the full price of a YoCam is still pretty good at just \$169 (£111), which is 16% off the RRP of \$199.99 (£132). The Kickstarter special bundle includes a YoCam in the colour of your choice, a clip mount and pendant cord, so you can position it any way you like, and a USB cable for charging the camera and retrieving data stored on it. By the time you see this, its \$80,000 will certainly have been met, which is a good sign for anyone interested in one!

URL: kck.st/1mchKaR

Funding ends: Thursday, 21st January 2015

Fluxo Smart Lamp

Most smart lamps don't allow you to do anything more complicated than change the colour and brightness of your illumination – if they allow even that much. But the Fluxo smart lamp is different. Using the app, you can control the position and direction of the light.

As well as producing diffuse or spot downward lighting, it can emit uplighting in a variety of colours, meaning you get to easily choose and change the mood of a room without doing so much as changing a bulb. The app allows you to 'draw' the type of light you want, as well as saving a number of different profiles for easy switching between them.

The unit itself is designed to be visually appealing and has a heat sink made from durable and efficient anodised aluminium. The light it produces is equivalent to up to 200W, and the internal LEDs have a lifespan of 60,000 hours at full power. Extra features include the ability to switch light profiles without the app (using a regular lightswitch) and presence-detection, so it'll turn off to save energy when you're not around.

The project has already surpassed its €50,000 goal, and there are still early bird tiers available for reduced prices if you act fast. Full price is €419 (£302), and even that saves €280 (£202) off the retail price!

URL: kck.st/1M4lwGR

Funding ends: Monday, 11th January 2015

YoCam
The World's Most Versatile Waterproof Life Camera



Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

MiniTool Partition Wizard 9.1

Another great program for your digital toolbox

We've tested quite a few partitioning programs in the past, some of them were exceptionally good, whereas others really didn't warrant the bandwidth to download them in the first place.

Of the better programs available for helping you partition and manage your drives, MiniTool Partition Wizard seems to be the one we come back to. It's easy, quick and can deliver a fair number of features from such a small footprint.

With that in mind, this week we're having a look at the latest version, 9.1.

A Wizard At Partitioning

Simplicity and overall usefulness are the key elements needed for a good partitioning program, and MiniTool Partition Wizard 9.1 has these in abundance.

Installation is a breeze and thankfully free of anything untoward, and the main user interface is free from clutter and unnecessary extras. As with most tools of this nature, the main UI is split into sections.

The larger portion of the screen is taken up with the current installed drive and disk information, with an added banner along the top displaying the current partitions. Along the left side are a collection of built-in tools, such as Copy Partition Wizard, Copy Disk Wizard, Rebuild MBR, Surface Test and so on. Finally, the upper part of the UI houses the various menus and icons that allow you to apply a change, undo anything and to access the properties of the currently selected disk or partition.

MPW9.1, as with some of the more professional partitioning programs available, will queue any changes you've decided to make to your current setup before allowing you apply the changes. This gives you the opportunity to review the changes you want to make and gives you the ability to back out of anything should you have made an error.

The Copy Partition and Copy Disk Wizards are particularly good. In fact, they're the fastest examples of cloning whole drives and partitions we've come across so far, which is

Features At A Glance

- Free version is excellent. Professional version is even better.
- Ability to fully manage your partitions and disks.
- UEFI boot supported.
- Perfect for technicians of all levels.

saying something, because we use cloning tools quite frequently.

Furthermore, the Rebuild MBR and the option to download the MiniTool Partition Wizard Bootable CD image are an absolute must for any technician's toolkit of programs and applications – as are the ability to resize, move, split, create or securely wipe any detected partitions on any of the installed and selected drives in the system.

New to this version is the ability to migrate an existing operating system to another drive without cloning the entire disk, support for Storage Spaces in Windows 8.1 and Windows Server 2012, more detailed logging information, an updated device information page once it's connected and support for Windows 10.

There are also many improvements from version 8, with some speed increases, better stability and greater ease of use across the entire GUI.

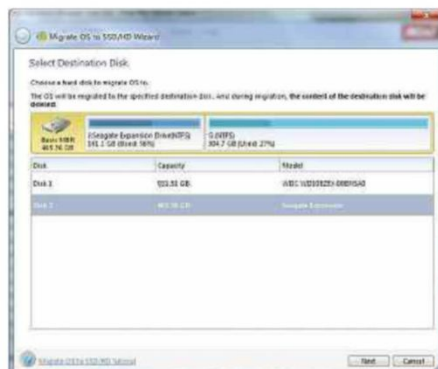
Conclusion

Minitool Partition Wizard continues to be one of the better partitioning management tools. The new version extends its capabilities and improves on what was already there, as well as keeping everything as simple as possible.

In short, well worth having in your arsenal of tools.



▲ The main UI is looking sleek



▲ The new option to migrate your OS to another disk is an interesting addition

Logging Off

When I start seeing Christmas decorations going up in people's homes, it's a reminder that this is the perfect time of year for those jobs you've been putting off. And, by 'those jobs' I'm talking specifically about chores on the PC, like making sure the backups are concurrent and there isn't the dust volume of a volcanic eruption clogging up your system.

Housekeeping isn't just something that old people keep in

a broken teapot. No, it is those actions that you need to perform on your technology, if you'd like to keep using it.

But (and this is the part I'm never too keen on) it's also the time you should really entirely rebuild your system from the ground up. Because of the ham-fisted way that Windows is designed, merging OS with apps and data, like some demented Christmas pudding, this is a hell of a task.

Yet deep down, we know that when it's done the PC will seem like it's been upgraded, and there will be faster starts and smoother shutdowns. It's just a challenging job that many, probably quite reasonably, can't face.

If you've got an OEM installation, there's also always that worry that when you try to activate, that it won't. And then you'll end up talking to some proficient reader of scripts wearing an 'I love my Surface' T-shirt in the hope that he'll take pity on you. We've all been there, talking to 'Trevor' based in a very remote but cost effective call centre.

Those determined to reinstall should consider running one of those useful apps you can find on the interweb that reveal the true product code of your installation, allowing for a theoretically painless refresh. But we also know that what I'm talking could easily go wrong, in so many ways, mostly because you end up not getting back a critical piece of data when you return everything, due to unforeseen circumstances.

What we'd all really like is a system where you can blitz the whole system, plug in a USB key and a backup drive and then watch the whole thing reassemble itself – like it does on Android (without the USB key or external drive) or even like Apple Mac users have had for some time.

Then this seasonal event could be something relaxing to do with downtime, not a nail-biting exercise in data-loss Russian roulette.

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The only real guarantee of getting the system back as you left it is to use a system image, but that also brings all the

rubbish back you're trying to remove, frustratingly.

Under these circumstances, it isn't surprising that many computers go years without a total refresh, when they badly need the experience.

Therefore, I'm here today to ask you to be nice to your computer this Christmas. For just a few hours each year you can bring proper ventilation, cool running and pristine temporary folders. It's not much to ask, and in return your system will run just like it did when it was new, use less electrical power and live far longer than you probably need.

Remember, computers aren't just for surfing grumpy cat videos or sending last-minute Christmas greetings!

Show some compassion to your system, while it's still working.

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: 7 William Norris, 8 Adorno, 9 Dreams, 10 Obelisk, 12 Vegas, 14 Flick, 16 Trigger, 19 Usenet, 20 Oracle, 22 Hydrodynamics.

Down: 1 Bind, 2 Plural, 3 Vamoose, 4 Anode, 5 Greece, 6 Firmware, 11 Bullseye, 13 Argonne, 15 Canard, 17 Gramme, 18 Study, 21 Lock.

DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. By the time this issue comes out, it will be very near to Christmas time, and there won't be another edition of the magazine until the end of the month. So merry Christmas, one and all. (Now there's a funny phrase. Who's the one?) We've already eaten a few mince pies in preparation, but we're looking forward to chomping on

some more festive nosh. No turkey, though, because let's face it, turkey is rubbish. It's basically just a big, dry chicken with less flavour. Instead, we're going to do what we did last year and have lamb. The only problem with that plan, though, is that someone has to cook it, and we're not sure we can be bothered. In fact, at this rate, we might just go down the local chippy and get a few battered sausages and some mushy peas. Only kidding, of course: mushy peas are gross. Who says you need to have turkey anyway? Why don't we all give these poor birds a break for once? What better present could they get than the gift of life itself. Plus by the time next Christmas comes round, they'll have grown even bigger.

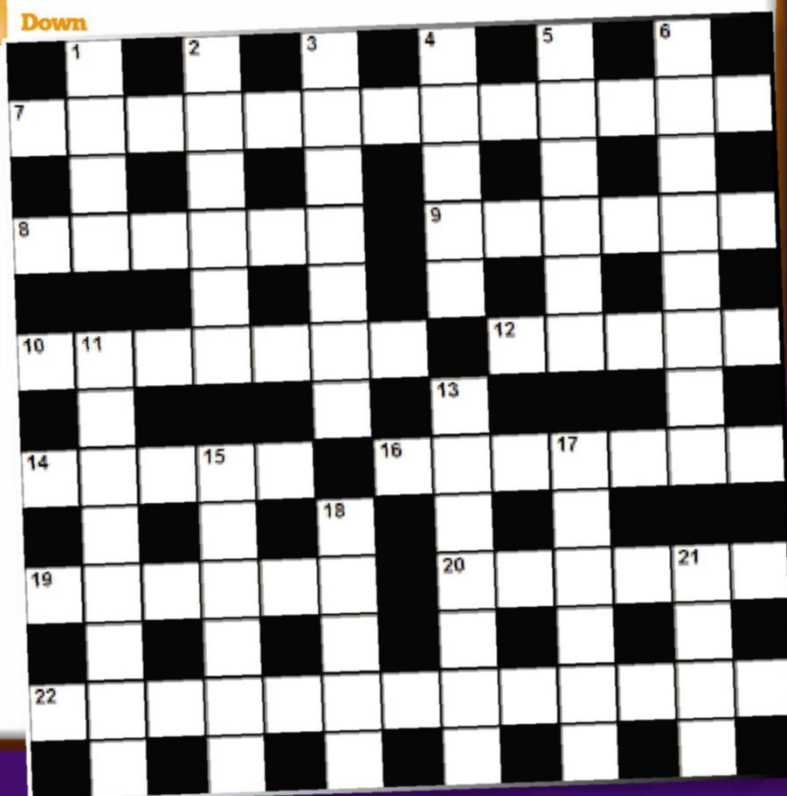
THIS WEEK'S CROSSWORD

Across

- 7 Scientists who deal with the general features of the universe, including the earth. (13)
8 A commonly heard contraction of "Go you get it?" (6)
9 Deliberately reduce the power rating of a device for safety or economic benefits. (6)
10 Statements or conditions that may limit or restrict claims. (7)
12 Asteroid 7824 discovered at Palomar Observatory by EF Helin. (5)
14 A short composition for a solo instrument, intended as an exercise or to demonstrate technical virtuosity. (5)
16 A weapon that is self-propelled or directed by remote control, carrying conventional or nuclear explosive. (7)
19 Small digital images or icons used to express an idea or emotion in electronic communication. (6)
20 To revoke or annul a law or act of parliament. (6)
22 People skilled in the process of writing in shorthand and transcribing the shorthand on a typewriter. (13)

- 1 Not divided or shared with others. (4)
2 A blurred or smeared mark on the surface of something. (6)
3 Campaign to arouse public concern about an issue in the hope of prompting action. (7)
4 A man who is much concerned with his dress and appearance. (5)
5 HEX 1E (6)
6 At or of a point at which a property or phenomenon suffers an abrupt change especially having enough mass to sustain a chain reaction. (8)
11 Convert a process or facility to operate without human intervention. (8)
13 Having a daily cycle or occurring every day. (7)
15 Clear a room or other space by disposing of clutter and unwanted possessions. (6)
17 The Greek lyric poet of Lesbos or airfield bird control device. (6)
18 Obscene gesture made with the index and middle fingers with the palm of the hand facing backwards. (1-4)
21 A unit of land area equal to 4,840 square yards. (4)

Down





Spam Emails We've Had This Week

What's been clogging our inbox most recently?

1 URGENT BUSINESS

This email from a Mr Dirk Moss starts well. Clearly wishing to show the urgency of his urgent business, he makes good use of his caps lock in the subject line. An exclamation mark might have been even more effective, but alas it was not to be. Anyway, Dirk is the "Chief Financial Officer of Bank in Europe", and one his customers recently died, leaving \$60 million just sitting in an account, with no next of kin to claim it. The only logical solution, of course, is to give it to us. And with our Christmas shopping yet to be completed, this windfall couldn't have come at a better time.

2 I wish to know if we can work together

"Good day," begins Barrister Alfred Kendrick, immediately helping us warm to this chap. He could have just said 'Hi' or 'Wassup', but no, he wants us to have a good day. What's not to like about that? Even better, just like our new friend Dirk Moss, Alfred is trying to offload some cash that belonged to a now "deceased" client, and he'd like us "to stand as the Next of Kin to my deceased client who made some deposit sum of money in millions united states dollars".

Sounds interesting, but we're not entirely sure how many millions he's talking about, plus he wants to "share in the ratio of 50/50". Yes, he wants half our cash – and for what? Shuffling a few papers around and getting a few signatures. No thank you!

3 GOOD NEWS!!

Any email that has the subject line 'good news' in block capitals gets our vote of approval, but this email goes the extra mile by including not one but two – yes, two! – exclamation marks. Fantastic work. The provider of this emphatic punctuation? Mr UCH SMART, a man so excited about life he writes his name in capital letters. UCH is a member of MMM Global (which has nothing to do with Micro Mart), "a community where people help each other financially", and it "helps millions of participants worldwide to find those who NEED help, and those who are ready to PROVIDE help for FREE."

We only have one question: "Where DO we SIGN up?"

4 Congratulations!!!

Okay, now we're just being spoilt: three exclamation marks! But what do you expect from a firm like "NOKIA Company Limited UK"? Well, yes, you might expect it to have its own email addresses, rather than sending us things via "patrick@shane7.freemove.co.uk", but what really matters here (other than the fact people still use Freemove email addresses) is that we've won £500,000, as part of Nokia/Microsoft's "struggle to alleviate poverty". We're not sure how randomly giving away half a million quid via email is a struggle, but who are we to argue? A couple more wins like this and we'll be able to buy Nokia ourselves.

5 Offer Letter

Finally, we come to a message from Mr Beno Hamadi, "a Business Relationship Manager with one of the banks in Nairobi, Kenya." He's a much a more serious sounding fellow than our other new friends, using a total of zero exclamation marks in his email, and he totally forgot to tell us which bank he actually works for in Nairobi, but we'll forgive him, since he's letting us in on a "discreet and lucrative sensitive business venture". Again, the details of this venture are oddly absent, but if we can't trust a man whose Christian name sounds like our favourite comic book, then frankly life isn't worth living.



▲ No, we're not sure what corned beef has to do this either

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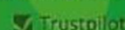
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